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CONTROL IN THE SUGAR-CANE INDUSTRY OF SOUTH AFRICA*

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SIMONS in his article, "The Requisites of Free Competition," makes the following challenging statement: "Thus, the fundamental issue, for liberals, is the same old issue of protection, of government intervention on behalf of particular groups and against the community." Since the end of the World War (1914–1918) and especially since 1930 there has been in practically every country in the world a veritable orgy of government regulation of economic activity, going under the euphonious name, "economic planning." Almost without exception such control has been designed primarily to bolster up the position of particular producer groups, usually with little or no consideration of the effect of individual control plans and still less consideration of the accumulated effect of numerous control plans upon the economy of a country as a whole, or, in other words, upon general welfare. A very good example of the dangers of legislation or state-supported programs to advance group welfare is found in the case of government control in the sugar-cane industry of the Union of South Africa.

The sugar-cane industry of South Africa is located along the coast of Natal, one of the four Provinces of the Union of South Africa. The cane-growing area is about 250 miles long and from 10 to 50 miles wide. Although the Natives of South Africa probably grew a few indigenous varieties of cane, the commercial production of sugar cane in Natal dates from 1848 when a farmer imported and propagated several varieties of cane at Compensation Flats near

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Durban. Cuttings were later distributed to farmers in the surrounding country. The first sugar mill was erected in 1850. From this small beginning the area under cane expanded slowly to 9,000 acres in 1860 and then more rapidly to 35,000 acres about 1866. Nearly every farmer crushed his own cane in a mill driven by ox power or steam. Considerable difficulties hampered the expansion of the industry before 1890. Diseases wiped out most of the varieties; lack of transportation restricted movement into the interior of the country, and sporadic imports from adjacent territories (Reunion and Mozambique) caused violent fluctuations in prices.

After 1890, however, the situation improved considerably. A new variety of cane, Uba, was found to be well suited to conditions in South Africa. Although it had a high fibre content and was low in sucrose,[1] Uba cane was resistant to diseases which had necessitated abandonment of other varieties. Uba cane, introduced in 1883, gradually supplanted all other varieties and was the predominant variety until after 1930. The opening of the gold mines in 1886 and the linking of Johannesburg with Durban by railroad soon after, increased the market for sugar and greatly reduced transportation costs. New and improved milling methods were introduced facilitating a decrease in the number of mills and an expansion in output per mill. In 1903 a tariff of 3s. 6d. per 100 pounds imposed by all four colonies (Natal, Cape Colony, Transvaal, and Orange River Colony)[2] gave the sugar industry of Natal a decided advantage over foreign sugar. In 1915 an excise duty of 1s. 0d. per 100 pounds was imposed upon all sugar, whether locally produced or imported, in addition to the original customs tariff.

In spite of temporary set-backs the area under cane expanded to 141,000 acres in 1915 and to 217,000 acres in 1925. Production of cane, which in 1891 amounted to only 12,000 tons[3] increased to 82,000 tons in 1910 and to 161,000 tons in 1925. Although sugar had been exported from Natal as early as 1862 the volume of exports exceeded 10,000 tons only four times up to 1918, After the War, however, exports increased rapidly and averaged 33,700 tons annually during the period 1920–21 to 1924–25. During the World War wholesale and retail prices of sugar in South Africa were

[1] Resulting in low yields of sugar per acre and per ton crushed and in high milling costs.

[2] These four colonies in 1910 became Provinces in the Union of South Africa.

[3] Short tons of 2,000 pounds.

pegged by agreement between the Government and the sugar industry at levels well below the world prices for sugar. This discouraged imports of sugar into South Africa. After the World War, however, world prices of sugar declined rapidly, whereas domestic prices in South Africa continued at about the war level. By 1925 world prices had fallen considerably below those prevailing for domestic sugar in South Africa, so that growing imports, mainly from Mozambique and Cuba, threatened the domestic price structure.

The general economic structure of the sugar industry in 1925, the year before the industry came under more direct government control, was about as follows. There were approximately 600 European planters and 1,500 Native and Indian[4] planters. Practically half of the European planters were in Zululand, a Native territory (part of Natal) opened to European settlement in 1905. Under agreement with the Government, settlers occupying certain types of farms under 99-year leases were required to devote part of their acreage to cane production, the cane to be shipped to a mill which had received a 99-year concession to handle all cane produced in the area. The remainder of the sugar planters were in Natal proper and held their land either freehold or on lease from a freehold owner. These planters also customarily made contracts to ship their cane to a particular mill for a period of years. There were in 1925 some 20 to 23 companies or individual families operating mills in Natal. Nearly all these milling concerns also operated extensive plantations. The total number of people engaged as operators or laborers in cane cultivation and milling probably did not exceed 40,000 in 1925.

The planters (as distinct from millers who also operated as planters) were almost universally dissatisfied with contract agreements between themselves and the mills and requested government intervention. At the same time both planters and millers, fearing increased imports, petitioned the Government for relief. As a result the Board of Trade and Industries[5] was instructed by the Government to make an exhaustive enquiry into all phases of the sugar-

[4] Owing to difficulties in securing adequate and efficient labor, the colonists in Natal had introduced indentured coolie labor from India from 1860 until 1913. At the end of the period of indenture many Indians elected to remain in Natal. Their descendants (some 220,000 in 1936) are almost all in the Province of Natal. Although Indians are engaged in commerce, peddling, and farming, they still constitute an important part of the labor force in the sugar industry.

[5] The South African equivalent of the Federal Tariff Commission and the Federal Trade Commission combined.

cane industry of Natal. After several months of investigation the Board submitted a report (No. 66 of April 14, 1926) in which were presented its findings and recommendations.

It was found that natural conditions for production of cane in South Africa were less favorable than in most other cane-producing countries; that Uba, the predominant variety of cane, gave less frequent yields, less sucrose per acre and per ton and had higher milling costs than varieties of cane grown in other countries; that cultural practices left much to be desired; that Native labor, used extensively in addition to Indian labor, was expensive and on the whole far from satisfactory; that farm lands were greatly overvalued[6] and that many planters had begun farming with insufficient capital, necessitating heavy mortgage indebtedness; that many planters were city people who had acquired cane lands as a speculation; that many of the farms were too small to permit economic operation; that there was poor coordination of milling and production operations resulting in severe losses to some planters each year; that although mills had modern and efficient machinery, milling operations as a whole were far from efficient; that lack of standardization of sugar resulted in unsatisfactory trade practices and tended to reduce consumption; that warehousing and physical distribution of sugar to the retail trade were most unsatisfactory and costly; that monopoly control existed over prices; that production of sugar had been expanding more rapidly than consumption, indicating a condition of chronic over-production; and finally that much land suitable to cane cultivation had not yet been brought into cultivation.

In spite of all these strictures the Board of Trade and Industries came to the remarkable conclusion that the sugar-cane industry was being conducted along sound economic lines. Again in spite of the fact that the industry employed only 40,000 persons, the population of South Africa in 1926 was 7.5 millions, and that the industry accounted for only about 1 per cent of the total national income, the Board concluded that the industry was vital to the prosperity of the country and merited relief. The Board, therefore, recommended that, subject to certain conditions, the import duty be raised from 4s. 6d. (including 1s. 0d. excise duty) to 8s. 0d. a hun-

[6] Neither in this nor in any of its other reports did the Board give any figures to show the value of farm land used for cane production. The various census reports give no information on the value of farm lands.

dred pounds. The conditions imposed were that the industry make sugar available to domestic manufacturers of candy and preserves at specially low rates; that the Government fix maximum wholesale and retail prices of sugar in South Africa; and that a more equitable agreement between planters and millers be drawn up. Not conditional to the imposition of a higher tariff was the pious recommendation that the industry take steps to eliminate as many of the uneconomic practices as possible. At the same time, the Board went on record as being opposed to any attempt to develop a beet-sugar industry in South Africa.

Later in 1926, a new and more equitable agreement between planters and millers, known as the Fahey Conference Agreement, was negotiated, the agreement to be revised at the end of 10 years, namely, 1936. Parliament passed a law (the Sugar Prices Act of 1926) establishing maximum wholesale prices, dealers' margins, and maximum retail prices. This sop to consumers was meaningless because retail prices at the time were actually lower than the maxima provided for in the law. Some attempt was made by the industry to eliminate some of the inefficient practices brought to light in the Report. At the same time, an Experiment Station, supported jointly by the industry and the Government, was established to investigate cultural problems and to import and propagate new varieties. Planters were prohibited from importing new varieties of cane.

With this combination of government and industry control it was possible to practically insulate the sugar industry of South Africa from foreign competition for the next few years. So favorable had the prospects of the industry become that land values, far from declining, tended to rise still further, and much additional acreage was brought into cultivation.

With the world-wide decline of prices, including sugar prices, that started in 1929, there was fear that imports of sugar into South Africa would increase in spite of the protection of 8s. 0d. per 100 pounds. The sugar-cane industry again clamored for government aid "against this threat to their unstable equilibrium," and the matter was again referred by a sympathetic Government to an even more sympathetic Board of Trade and Industries. This agency, after a short investigation, issued a second report (No. 106 of March 12, 1930) recommending that the tariff (plus excise duty) be increased from 8s. 0d. to 12s. 0d. per 100 pounds, a recommendation which was immediately made effective by law.

The Government, however, instructed the Board to continue its enquiries into conditions giving rise to disputes and friction between planters and millers. In its third report (No. 116 of 1931) the Board drew attention to alarming increase in acreage and production, the bulk of the increase coming from plantations operated by milling concerns. The Board recommended that millers should bear a larger part of the loss incurred on exports and also that a permanent arbitration board be established to adjudicate disputes between planters and millers as well as deal with certain matters of common interest to the industry. Nothing was done at the time.

World prices of sugar continued to decline, and again it was feared that the higher tariff protection would not keep out foreign sugar. Upon representations from the industry the usual procedure of referring the matter to the Board of Trade and Industries was followed. This agency made another report (No. 132 of February 27, 1932) recommending that the tariff be raised again from 12s. 0d. to 16s. 0d. per 100 pounds, a quadrupling of the tariff since 1925. The necessary legislation was forthcoming so that since 1932 South Africa has had a virtually prohibitive tariff of 2d. (4 cents) a pound. At the same time, Parliament, in order to show that consumer interests were not entirely neglected, passed a law reducing maximum retail prices of sugar from 3¾d. to 3½d. for first refined sugar and from 3½d. to 3¼d. for mill-whites at coastal ports. In the interior maximum retail prices were higher. Again, this maximum price meant little because retail prices prevailing at the time were on a lower level.

The Fahey Conference Agreement was to expire in 1936, so in 1935 the Board of Trade and Industries began an enquiry into the operation of this Agreement. As part of the investigation, the Board made an extensive study of costs of producing cane. Cost records obtained from 72 European planters (exclusive of miller-planters) indicated that in 1932–33 20 planters produced less than 2,000 tons of cane; 31 produced between 2,000 and 4,000 tons; 15 between 4,000 and 6,000 tons; and only 6 produced over 6,000 tons.[7]

[7] The South African Sugar Yearbook, 1939–40 (p. 250) shows the following figures on production by 615 European planters for the year 1938–39:

Production	*Number of planters*
Less than 1,000 tons	115
1,000 to 2,000 tons	86
2,000 to 3,000 tons	72
3,000 to 5,000 tons	196
5,000 to 7,000 tons	68
7,000 to 10,000 tons	48
Over 10,000 tons	30
	615

Costs of production varied from 21s. 0d. per ton for the producers with less than 2,000 tons to 12s. 0d. for producers with over 6,000 tons, the average for the 72 producers being 15s. 1d. The cost of producing cargo sugar (including the cost of cane) was found to be £10. 17s. 1d. per ton; mill-white sugars (including cost of milling cargo sugar) £11. 15s. 2d. per ton; and refined sugar (including the cost of milling cargo sugar) £14. 14s. 5d. The Board estimated that mills producing cargo sugars had earned an annual return of 8.5 per cent on investment over the four-year period 1930–31 to 1933–34. Mills producing mill-white sugars had earned for the same period 23.2 per cent per annum on investment, and refineries 17.7 per cent.

The analysis made by the Board showed that farms (owned by Europeans) producing less than 4,000 tons of cane a year were too small for economic operation.[8] The Board issued a report (No. 124 of 1935) recommending extensive revision of the Agreement between millers and planters. The recommendations included a new basis of payment for cane; machinery to limit further expansion in acreage; the introduction of certain long-overdue reforms in the operation of the industry; and the establishment of an agency to arbitrate industry disputes. As a result, Parliament passed the Sugar Act of 1936 which provided for the establishment of a Sugar Industry Central Board and Mill Group Boards; also a more "scientific" method for determining prices to be paid to producers. As a part of this more "scientific" basis of payment was a formula which required that small producers receive a somewhat higher price for cane than larger producers. This was designed to aid small producers, who, the Board had found, could not operate economically—in other words, to perpetuate inefficient operation by indirect subsidy.

Since 1935 several additional enquiries have been made into various minor aspects of the sugar-cane industry, but the pattern of control by then had evolved to its logical conclusion—extensive governmental support to perpetuate a monopolized and overcapitalized industry. What have been the economic results of this government assistance to the sugar-cane industry?

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[8] No data are available as to the size of sugar-cane farms operated by the 1,550 Natives and Asiatics. As non-Europeans produce only about 7 per cent of all cane, the average output of non-European planters in 1934–35 was about 175 tons (7 per cent of 3,874,200 tons of cane ÷ 1550).

Extreme caution must be exercised in analysing what appear to be cause-and-effect relations. Numerous other factors in the general economy of South Africa and in the sugar-cane industry itself have undoubtedly influenced developments in that industry during the past two decades. Nevertheless, it would seem unquestionable that much of the expansion in the industry since 1926 can be attributed directly to the favorable future which the industry envisaged as a result of a sympathetic attitude on the part of the Government. Further caution in interpreting developments is necessary because of the marked annual fluctuations of output of sugar arising out of variations in climatic and other cultural factors. To eliminate the effect of year-to-year fluctuations in output, data are presented on a five-year average basis.

Using the years 1921 to 1925 as a base and remembering that special government control and support began in 1926, it is found that average annual acreage during the five-year period 1926–1930 was 29 per cent greater than during the base period. It was 55 per cent greater during the next five years, 1931–1935, and 71 per cent greater during the years 1936–1940. During the last five-year period (1936 onwards) the area under cane remained fairly constant around 358,000 acres—a result of industry control. Output of cane increased more rapidly than acreage, especially during the last five-year period in which output of cane averaged 148 per cent higher than during the base period. This was due in large measure to the fact that, since 1932, soft varieties of cane have tended to supplant the older, hard, Uba variety. In 1938, only 41 per cent of the total acreage under cane was planted to Uba as compared with practically 100 per cent in 1931. Within a few years it is probable that soft varieties will have entirely supplanted Uba. As soft cane has a higher sucrose content and less fibre than Uba, both a higher output of cane per acre and a higher output of sugar per ton of cane are to be expected. Moreover, the cost of milling soft cane is very much less than that of milling Uba cane. (See table 1.)

Output of sugar increased at a somewhat more rapid rate than output of cane from 1926 to 1935 and very much more rapidly during the last five-year period—the result of the greater use of the soft varieties of cane.[9] Output of sugar during the last five-year period was just over three times greater than during the base

[9] Part of the increase was due to improvements in milling practices which resulted in a decrease in wastage.

TABLE 1. PRODUCTION AND PRICES OF CANE AND SUGAR IN SOUTH AFRICA

Five-year periods	Acreage in cane	Production of cane (tons)	Production of sugar (tons)	Imports of sugar (tons)	Exports of sugar (tons)	Domestic consumption (tons)	Prices*		
							Producer per ton of cane	Wholesale (1st refined) per ton	Retail per lb.
							s. d.	£ s. d.	d.
1921–1925	209,900†	1,731,000†	163,200	6,900	33,700	136,400	16. 5	25. 11. 11	4.64
1926–1930	270,300	2,636,500	264,900	11,300	85,400	190,800	16. 1	21. 14. 2	3.89
1931–1935	326,000	3,594,500	365,600	2,800	173,300	195,300	13. 3	19. 3. 0	3.62
1936–1940	358,000‡	4,298,900‡	496,700	1,400‡	251,800‡	239,800‡	14. 9§	19. 11. 4§	3.41§
Percentage change average 1921–1925=100									
1926–1930	129	152	162	163	255	140	98	85	83
1931–1935	155	208	224	41	514	144	81	75	78
1936–1940	171	248	304	20	747	176	90	77	73

* Based on years 1923–1925 only in order to eliminate effect of high post-war prices.
† Based on years 1923–1925 only. Data not available for earlier years.
‡ Average 3 years 1936–1938 only; later figures not available.
§ Average 4 years 1936–1939.

Sources of data:
South African Sugar Yearbook 1939–40 and Official Yearbook for the Union of South Africa. No. 20. 1939.

period. In contrast to this phenomenal increase in sugar production in South Africa, world production of sugar during the years 1935–1940 was only 35 per cent greater than during the years 1921–1925.[10] Imports had declined to a mere dribble, but exports, which during the base period averaged only 33,700 tons, increased to nearly 252,000 tons during the period 1936–1940, an increase of nearly 650 per cent. In 1939 over one-half of the output of cane for that year was exported. Since 1930 sugar exported from South Africa has realized about one-third to one-half less than sugar sold in the domestic market.

Domestic consumption of sugar during the last five years (1936–1940) averaged about 76 per cent greater than during the base period—an increase far greater than that in world consumption of sugar. This phenomenon can be attributed to two factors in addition to a decrease in retail prices of sugar in South Africa. First, unlike other countries, South Africa has experienced an unparalleled period of prosperity since 1932, a prosperity emanating largely from the gold industry of that country. The realized value of gold in 1939 was around £90 million as compared with £45 million in 1929. Government revenue, manufacturing, transportation, and employment reached the highest levels ever attained in 1939. Second, in 1936 the sugar industry, under pressure from the Government, made available to the consuming public a low grade of sugar which was sold at 1d. per pound less than mill-white sugar. In 1936 some 32,000 tons of this sugar was sold, in 1937 about 45,000 tons, and in 1938 about 65,000—an increase in three years of 46 per cent as compared with an increase of only 1.2 per cent for mill-white sugar.

Retail prices of sugar, which averaged 4.64d. (9.25 cents) per pound during the base period, declined to 3.89d. per pound during the years 1926–1930 (most of this decline having occurred after 1926) and to 3.41d. per pound during the years 1936–1938, a decline of 26.5 per cent since the base period. In contrast, retail prices in the United Kingdom declined about 50 per cent during the same period. In 1938 sugar exported from South Africa to the United Kingdon retailed in that country at 1d. per pound less than retail prices of sugar in South Africa, after paying all transportation costs from Durban to England.

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[10] U. S. D. A. Bur. Agr. Econ. The world sugar situation. P. 9. April 1940.

The sugar industry contends that the industry bears the loss on exports, that is, the difference in export and domestic wholesale prices of sugar. The Board of Trade and Industries apparently has agreed with this contention. Actually, however, the consuming public has had to subsidize a continually growing volume of exports. The millers tend to operate upon a uniform margin whether handling cane for the domestic market or for export. The returns received by producers, therefore, are an average of domestic wholesale prices and export prices per ton less milling costs. In other words, if less cane was exported, retail prices could be lowered.

Although retail prices in South Africa have declined considerably since 1925, costs of production and milling costs have probably declined to a still greater extent, especially since 1932, when the new soft cane varieties were introduced. In 1925 there was an excess of milling capacity. The large volume of output (in the absence of a considerable increase in capacity) should have resulted in a decrease in milling costs per unit. Improved milling methods, and especially the introduction of soft cane, should have reduced milling costs still further. At the same time the soft varieties of cane have greatly increased yields of sucrose and sugar per acre, thus reducing costs of production.

There seems to be a widespread illusion in South Africa that the demand for sugar as well as other agricultural products is inelastic, and that, therefore, a reduction in retail prices will not call forth an increase in the volume consumed. In regard to sugar at least, this belief is entirely erroneous. South Africa has a large non-European population,[11] with a very low family income. The average income per adult Native does not exceed £50 ($250) per year, only about two-thirds of which is in cash, the balance being the value of food and quarters supplied. The average income of European adults is from four to six times greater than for Natives. For the bulk of the non-European population sugar is a luxury, used rather sparingly. In spite of this fact it is probable that the aggregate consumption by this part of the population accounts for at least 50 per cent of all sugar consumed in South Africa. A substantial decrease in retail prices from 1926 onwards would probably have greatly accelerated domestic consumption. The remarkable expansion in con-

[11] Out of a total population of 10,100,000 in 1939, only 2,100,000 were Europeans. Nearly 7,000,000 were Natives and 1,000,0000 Colored and Indians (from India).

sumption of low-grade sugar since 1936 would seem to support this contention.

There would seem to be good reason to suppose that domestic consumers could absorb a very much larger proportion of the annual output of sugar in South Africa if part of the money expended annually in subsidizing unprofitable exports could be used to supply low-income groups with sugar, somewhat along the lines of the stamp plan in the United States. If that were done, the public of South Africa would be subsidizing consumption by low-income groups within the country instead of by consumers in the United Kingdom, as has been the case.

The policy of government-cum-industry control embarked upon in 1926 has encouraged a tremendous expansion in the acreage and production of sugar, thereby necessitating a growing volume of exports. The very favorable future expected for the industry as a result of sympathetic and misguided treatment by the Government has encouraged the diversion into an already over-capitalized and over-expanded industry of relatively minor importance in the economy of South Africa, of still more capital, land, and labor. Even more regrettable is the fact that the continued expansion of the industry has placed a growing burden[12] upon the consuming public of South Africa. This burden is highly regressive in its effect as it presses most heavily upon the non-European population least able to bear it.

It is extremely difficult to determine to what extent the sugar industry has increased in efficiency since 1926 and whether government control accelerated or retarded the introduction of more efficient methods of operation. There has undoubtedly been a considerable increase in the physical efficiency of producing and milling cane. Much of this has come as the result of experience, both in South Africa and elsewhere, in the techniques of producing and milling cane. At the same time the industry was forced to adopt certain improved practices as a condition of continued government support. On the other hand, it is safe to say that, without government support, the industry would have been forced to adopt more efficient methods of operation, if it was to have survived. Moreover, if consideration is given to the fact that most producing units are

[12] That this burden is growing is clear from the fact that a larger part of the aggregate amount spent by consumers annually for sugar is required to offset the losses (difference between domestic and export price of sugar per ton) on sugar exported.

still too small to ensure efficient operation, that a growing volume of sugar has to be exported annually at unprofitable prices, and that the industry has attracted still more capital than was invested in it in 1926, it is extremely doubtful whether there has been any increase in its economic efficiency.

If the Board of Trade and Industries in 1926 had paid more attention to, or had had a better knowledge of, the economic principles, elasticity of supply and elasticity of demand, much of the uneconomic over-expansion of the sugar-cane industry of South Africa could have been avoided. If retail prices had been lowered more substantially, domestic consumption would undoubtedly have expanded considerably. Moreover, if the sugar-cane industry had been forced to eliminate immediately the numerous inefficiencies, especially to devalue land on a sounder basis and to reorganize farming in more economic units, it is not improbable that the industry could have survived and even expanded with little or no increase in tariff protection.

Instead a policy was embarked upon which has more and more subordinated the welfare of 10,000,000 people to benefit at most some 50,000 people. This latter number is overwhelmingly composed of Natives and Indians, who could readily have been absorbed in other industries in South Africa.[13] The effect of government control in other branches of economic activity in South Africa has been similar in direction, if not in degree, to that in the sugar-cane industry.

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[13] It is significant that since 1933 practically all branches of economic activity have complained about the shortage of Native labor.

LONG-TERM FORECASTING OF FRUIT AND NUT PRODUCTION*

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Bureau of Agricultural Economics

PROPHECY is always difficult, perhaps even dangerous, but sometimes unavoidable. In the fruit and nut industries, long-term forecasts are made rather commonly by growers, processors, marketing agencies, transportation agencies, credit institutions and others. The sale of an orchard, a loan on an orchard, the planting of young trees or any one of several similar decisions, assumes a forecast regarding production, prices and income for many years in the future. There is no possibility of avoiding such forecasts. The only choice lies in the selection of material to be considered, the consciousness with which forecasts are made and the degree to which the possibility of error is recognized.

In the forecasts which the fruit and nut industries are forced to make, volume of production is only one factor. Production in competing areas and of competing commodities, possible or probable shifts in consumer preferences, the general price level and other factors must all be considered. A forecast of the volume of production is worthwhile however. Total supply is certainly one factor which the producer and marketing agency must consider. Marketing and transportation agencies are particularly concerned with volume of production. Volume is a major factor affecting price, so that forecasts of production are basic to price forecasts.

Complete forecasting of total and market supply depends upon many factors, including returns received, which in turn depend very largely upon prices. A production forecast must be based upon a supply curve for the product and for the period involved. Cassels[1] has emphasized: (1) "the time-character of the supply curve, i.e. the dependence of the responses made upon the period allowed for the adjustments to take place"; and (2) "the one-way nature of the supply curve, i.e. the fact that the process of contraction is not an exact reversal of the process of expansion and consequently the elasticities for the upward movement and the downward movement

* The authors wish to acknowledge the helpful criticisms of Francis C. Jones, Bureau of Agricultural Economics, which enabled them to remove some errors and ambiguities from their analysis.

[1] J. M. Cassels, The nature of statistical supply curves. JOUR. FARM ECON., 1933, 15(2): 378–387.

may be entirely different." Cassels' analysis was built upon the earlier theoretical analysis of Alfred Marshal. Later writers have generally emphasized these same two major points.[2]

Fruit and nut growers, to a greater degree than most other agricultural producers, operate on the basis of their expectations of the future. One of the central problems of the producer, and of those who seek to advise him, is to narrow the gap between expectations and reality.[3] It seems axiomatic that forecasts should cover the same period as the expectations upon which the producer undertakes a particular action. A farmer who plants apple trees expects them to come into bearing in 8 to 10 years, into full bearing in 15 to 20 years, and to remain in production for 30 to 60 years. Walnut trees in California are expected to remain in production for 100 years. Expectations cover these long periods; can forecasts be made to match them?

This paper considers fruit and nut production largely from the supply side, and suggests that forecasts of production for 10 to 20 years may be made without great dependence upon price conditions of that period. Long-term forecasting, even for such a restricted scope as the volume of fruit production, is a relatively neglected field. In a recent review of the literature, the authors found very few long-term forecasts for the fruit industry, although many writers acknowledge that fruit growers cannot escape the necessity of such forecasts.[4]

Trend Analysis Method of Forecasting

A common method of the economist is the examination of the past, in an effort to discover trends and/or cycles. In the case of fruit or nut production, this analysis may be made by varieties, or by important producing localities, or both. Movements may be dis-

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[2] R. L. Mighell and R. H. Allen, Supply schedules—"Long-Time" and "Short-Time." JOUR. FARM ECON., 1940, 22(3): 544–557. J. M. Cassels, and Wilfred Malenbaum, Doubts about statistical supply analysis. JOUR. FARM ECON., 1938, 20 (2): 448–561. R. H. Allen, Erling Hole, and R. L. Mighell, Supply responses in milk production in Cabot-Marshfield, Vermont. U.S. Dept. of Agric. Tech. Bul. 709, 1940.

[3] T. W. Schultz, Theory of the firm and farm management research. JOUR. FARM ECON., 1939, 21(3): 570–586.

[4] One outstanding effort to analyze some of the long-term factors in orchard production is found in Bul. 323, New Hampshire Agricultural Experiment Station, Studies in economics of apple orcharding. III. A study of orchard problems by the budget method of analysis, by H. C. Woodworth and G. F. Potter. Average prices and costs are used for analyses extending for 60 years, although the need for revisions in light of apple outlook is recognized.

covered in this way which would be overlooked in United States totals. The analysis of trends and cycles may be highly statistical, or it may be more informal, depending largely on the tastes and skill of the investigator.

In its crudest form, the trend analysis approach involves mechanical extension of past trends and cycles. In many instances the evidence regarding trends and cycles is not clear, so that it may be difficult or impossible to establish them with a degree of certainty acceptable to the investigator, to say nothing of critics. Even if the record of the past is clear, question may still be raised as to the propriety of mechanically extending trends and cycles into the future. The forces which determined past trends and cycles may have spent themselves, and the future may be influenced by very different factors.

At this point most workers will be inclined to introduce some modifying considerations, some "judgment." They will begin to consider the age distribution of trees now standing, recent planting rates, competition from other fruits and similar items.[5] These factors all have a bearing on future production of a particular fruit. The problem arises as to their significance. What is the precise importance of a comparatively large number of non-bearing fruit trees? Some objective process is needed to convert information of this type into specific production forecasts. Once some deviation from a mechanical projection of trends and cycles is admitted, objectivity is lost unless some more refined method can be substituted.

Actuarial Method of Forecasting

The actuarial method of forecasting is based upon the fundamental facts that fruit and nuts are produced upon mature trees, that mature trees cannot be produced without a definite and relatively fixed tine interval, and that the tree dies eventually. The actuarial method can be applied to any kind or variety of fruit or nuts and any location for which data are available. The examples which follow are drawn from apple production, because the authors were particularly interested in that fruit. Adequate data are lacking, so that the results secured are valuable chiefly as an indication

[5] For examples of some of the better instances of this type of forecasting, see: I. G. Davis, Frederick V. Waugh and Harold McCarthy, The Connecticut apple industry. Storrs Agricultural Experiment Station Bul. 145, May 1927. M. R. Cooper, Outlook for the apple industry, JOUR. FARM ECON., 1929, 11(1): 141–151.

of possibilities of the method. In order to apply the actuarial method, it is necessary to have a census of trees by age groups, and to have information on the annual loss of trees, annual rate of planting and yield per tree by age groups.

Census of Trees

A census of trees by age groups, on a complete count or sample basis, is the starting point for this method. The classification of trees into age groups, including the number of groups and the class limits of each, should depend to a considerable measure on the proposed further analysis of these data. Many past censuses have been weakened by an "all-over" group which contained too many trees and trees that were too young. For instance, one census grouped all apple trees of 27 years and over into one group, in spite of the fact that some of these trees were over 35 years of age, and that the average age at removal was probably about 40 years. The census should surely distinguish varieties and should be tabulated by districts or localities exhibiting generally similar production conditions. In addition to numbers of trees by age groups, information is useful on acreage of trees on the basis of a solid stand of trees of this variety and age, although this information does not enter directly into the later analysis. In many areas, the land which is well suited to fruit or nut production is sharply limited in area. The number of trees in such an area might be decreasing, but if the best land is all planted to fruit or nuts, it may be difficult to expand until present trees are completely removed.

Loss of Trees

Some trees will be lost each year, by death or by removal. This loss will vary between age groups. By applying the appropriate average annual loss rate to the number of trees in a given age group at the beginning of a period, and multiplying by the number of years in the period, the total loss by age groups can be calculated. Deduction of this loss from the number of trees at the beginning will give the number of trees by age groups at the end of the period. This procedure simply gives a basis for estimating the number of trees by age groups at a given future date. Periodic censuses will still be necessary, as a check upon such estimates and as a new bench mark from which to project further estimates of the future.

Total loss of trees in a given period is made up of at least four elements:

1. Natural deaths of trees, or non-survival in spite of the growers' efforts.
2. Removal of fillers.
3. Removal of trees whose yields are declining.
4. Removal of relatively high-yielding trees.

Loss of trees in these various ways will be influenced by different factors. Unfavorable climatic conditions will be important for the first type of loss; price conditions will influence the other types of loss to a major extent. Returns from the inter-planted fruit and alternative opportunities for use of the land will affect tree removals. When trees get old, harvesting and other costs may increase so that trees are pulled even though yields are fairly high. The reasons for tree removal should be secured from growers, and the rate of removal for various causes related to particular factors, such as the price of the product. Some sample tree censuses have secured information on the total number of tree removals in a given period, but have never secured the age of the trees removed, or the reasons for their removal. The data were therefore nearly useless for the purpose of long-term forecasting.

There seem to be three general ways of estimating each type of loss: (1) by Records kept each year by an adequate sample of growers, showing trees pulled and those that were dead by variety and age group, with assignment of reason for removal of the tree. (2) By comparison of tree censuses in the same area at uniform intervals, preferably for the same farms, with an attempt on the part of the grower to assign reasons for tree removal. If the census covers the same farms, at intervals of not over 5 years, the latter method is probably as accurate as the former. (3) In those areas where the total number of trees planted per acre has been highly uniform, the difference between the number planted per acre and the present number per acre is the total removal.

Attempt to Estimate Apple Tree Removals

No records are available on apple tree removals by age groups, or on reasons for removals when total removals were secured. It is necessary to estimate removals by age groups from data collected for different purposes. A sample census of commercial apple trees by age groups was taken for all regions of the United States in 1928, and for selected districts in the East in 1934 (table 1). Although these two sample censuses did not cover exactly the same area and

each dealt with commercial orchards only, the percentage distribution by age groups was applied to the entire apple population in the Middle and South Atlantic States, as estimated from the Census of Agriculture, to secure an approximate total number of trees by age classes (table 2).

TABLE 1. AGE DISTRIBUTION OF APPLE TREES—COMMERCIAL ORCHARDS IN MIDDLE AND SOUTH ATLANTIC STATES, 1928, AND SELECTED DISTRICTS IN EAST, 1934

Middle and South Atlantic commercial orchards, 1928*		Selected districts in East, 1934†	
Age of trees	Portion of total trees	Age of trees	Portion of total trees
Years	*Percentage*	*Years*	*Percentage*
0– 3	6.54	0– 4	9.9
4– 8	18.58	5– 9	7.1
9–13	14.06	10–14	14.9
14–18	26.24	15–19	13.8
19–23	11.47	20–24	24.0
24–28	8.74	25–29	13.9
29–33	4.16	30–34	10.0
34–38	2.61	35–39	4.2
39–43	1.78	40–44	1.3
44 and over	5.82	45 and over	0.9

* U. S. Department of Agriculture Yearbook, 1931, page 719.

† Apples—yields, prices, returns per acre, and trend in plantings of important varieties grown in selected districts of the East (Virginia, West Virginia, Maryland, Pennsylvania and Delaware) by W. H. Youngman, R. P. Matteson, C. J. Blair and J. A. P. Saunders, Bur. Agr. Econ. and F.C.A.

The difference between the number of trees in 1928 and the number remaining in 1934, except for plantings since 1928, represented total removals from all causes. Aside from the arbitrary assumptions necessarily underlying table 2, the data have several limitations from a purely statistical viewpoint. In the first place, losses are for a 6-year period. Conversion to an average annual loss figure cannot be made accurately from data for such wide class intervals, since losses undoubtedly change from year to year within the class interval. As will be shown later, average losses for five-year periods are useful in many types of analysis, and these average rates can only be estimated from the data for 6-year periods. In the second place, the open end class for the oldest trees is so large and has such a high loss rate that it has a serious effect upon any further calculations.

With these statistical limitations in mind, it is possible to make some general observations about average annual loss rates. For the trees which were 5–9 years of age in 1934, the average annual loss rate during the preceding period had been approximately 2.3 per cent.[6] These trees had moved from a group of less than 5 years of age to a group of 5–9 years of age; hence this average loss rate is probably most applicable to trees of approximately 4 years of age. Similarly, the average annual loss rates for the various groups of trees are as follows:

Group centering at 9 years of age							6.1 per cent[7]	
Group	"	"	14	"	"	"	3.7	"
Group	"	"	19	"	"	"	4.6	"
Group	"	"	24	"	"	"	.7	"
Group	"	"	29	"	"	"	1.6	"
Group	"	"	34	"	"	"	3.4	"
Group	"	"	39	"	"	"	10.1	"

The loss of trees in the group 45 years and older in 1934, was over 90 per cent in the 6-year period, or over 15 per cent per year when calculated on the basis outlined above. It is impossible to know the average age of trees to which this loss corresponds. It would be desirable to place this loss on an annual basis in such a way that the percentage loss by years could be applied to the number of trees at the beginning of the year to obtain the number of trees at the end of the year. From the data in table 2, such a rate would rise from about 10 per cent when trees were 40 years of age to 100 per cent in the year when the last tree was removed.

The results obtained appear reasonable, in a general way, as a first approximation to total removal rates, not only for this area but for apple producing areas in general. Losses are moderate until per-

[6] Calculated by dividing percentage loss for whole period by 6. The average annual loss could have been calculated by use of a formula which would have given a loss rate applicable only on an annual basis, whereas the average loss can be considered as applicable only to the whole period of a class interval. A correct loss rate by years would not have remained constant throughout the period of a class interval. The difference between the two methods is slight for small losses, and it appeared preferable to use a method of calculation which emphasized the fact that the average rate was valid only for the period as a whole.

[7] Had the period between sample censuses been 5 years, the results would have applied more directly to 10-year old trees. However, these trees were from 4 to 8 years of age in 1928 and 10 to 14 years of age in 1934. Assuming they averaged 6 and 12 years at these respective dates, the average age of the two periods was 9 years. Similar reasoning underlies use of the other ages to which loss rates are applicable.

TABLE 2. ESTIMATED LOSS IN APPLE TREES, MIDDLE AND SOUTH ATLANTIC STATES, 1928–34*

Age of trees in 1934	Estimated total trees		Removal and loss in 6 years 1928–34	
	In 1928, that would have fallen in specified class if still alive in 1934	1934	Trees	Poriton of trees at beginning of period
Years	*1,000 trees*	*1,000 trees*	*1,000 trees*	*Percentage*
0– 4	—	3,740	—	—
5– 9	3,130	2,690	440	14.06
10–14	8,880	5,640	3,240	36.49
15–19	6,720	5,220	1,500	22.32
20–24	12,540	9,090	3,450	27.51
25–29	5,480	5,260	220	4.01
30–34	4,180	3,790	390	9.33
35–39	1,990	1,590	400	20.10
40–44	1,250	490	760	60.80
45 and over	3,630	340	3,290	90.63
Total	47,800	37,850	13,690	—

* For description of method, see text.

haps 7 years (the mid-point of the 5–9 year group); these are probably trees that failed to live. In the age groups centering at 10 years, losses or removals are greater, showing the influence of filler and undesirable variety removal, as well as possibly other factors. In the group centering at 15 and 20 years, losses are moderate, as filler removal is completed. Possibly some trees are removed in these periods because it is realized that they were planted in poor locations only when the time came for them to come into full bearing. From about 25 until perhaps 34 years, losses are at their lowest point. A tree which has survived to this point is seldom removed during this age interval. At about 35 years, losses or removals begin to climb with increasing rapidity. The sample of trees was small for the class of 45 years and over, yet the losses in this group dominate the forecast, as will be shown later.

Using the removal rates shown in table 2, the age distribution of a constant population of apple trees can be estimated. This distribution corresponds to a standardized population of human beings. On the basis of 1,000 trees less than 5 years of age, there would be approximately the following numbers of trees:

5–9 years of age	883 trees
10–14 " " "	615 "
15–19 " " "	501 "
20–24 " " "	386 "
25–29 " " "	373 "
30–34 " " "	344 "
35–39 " " "	286 "
40–44 " " "	141 "
45 or more years of age	Very few trees

Losses may occur by removals in producing orchards or by complete removal of the orchard. Assuming that the annual loss under 5 years of age is 2.5 per cent (no data were available on which to estimate this loss), nearly 1,150 trees would have to be planted in order for 1,000 trees to survive to 5 years of age. In such a constant population of apple trees, about 20 per cent would be 5 years of age or less, and approximately 40 per cent would be 10 years or less. On the basis of these data, unless the number of non-bearing apple trees exceeds approximately 35 per cent of all apple trees, there is no basis for assuming an ultimate increase in bearing trees. Numbers of non-bearing trees must be judged in comparison with some standard distribution, or their numbers are meaningless. The fact that apple trees in the United States have never approximated such an age distribution, increases, rather than decreases, its value for comparative purposes. Waves of over-planting followed by waves of under-planting, have resulted in comparatively large numbers of trees of particular ages and comparatively small numbers in the next older and next younger age groups. A distribution based upon adequate data regarding tree removals would be very useful. While such an age distribution would inevitably be affected by influences of the past which might not necessarily be repeated in the future, periodic refinement of the standard with increasingly reliable data would make its use more valuable as time went on.

Rate of Planting

The rate of planting trees is the rate at which potential productive plant is created, and must be considered in using the acturial method of forecasting fruit production. New bearing trees must come from present non-bearing trees. just as new workers come from persons now too young to be employed. Changes in planting rates are not effective upon the number of bearing trees for a period

equal to the time required for a young tree to reach bearing age. Wherever there are large numbers of bearing trees of any long-lived kind, changes in planting rate alone will change total production relatively little for a period twice the time required for the tree to come into bearing. Estimates of planting rates need not, therefore, be highly accurate in order to forecast the volume of fruit production for several years.

For example, there were approximately 38 million apple trees in the Middle and South Atlantic states in 1934, as shown by table 2. Less than one-third of the bearing trees were from 10 to 19 years of age, representing survivals from plantings of a decade earlier. Had plantings in this earlier decade been twice as great as they actually were, survival rate remaining the same, bearing trees would have been only 30 per cent higher than was the case, with production increased a somewhat smaller amount.

In the past, planting rates appear to have been influenced chiefly by fruit and nut prices of the very recent past and current date. While this is an irrational basis, if it is fully imbedded in the consciousness of most growers, it can safely be used as a basis of prediction. No information on plantings is available, except as inference can be drawn from the number of non-bearing trees at successive census dates. Analysis should be directed toward the effect of prices on planting rates.

Yield Per Tree by Age Groups

In most kinds of fruit and nuts, the yield per tree starts at a low level, rises as the tree comes into full bearing, remains approximately constant for some years, and then declines, slowly at first but more rapidly later. For instance, in the Yakima Valley, Washington, the average apple yield per tree was as follows:

Trees 6 to 9 years of age	80 pounds
Trees 10 to 16 " " "	322 "
Trees 17 to 26 " " "	406 "
Trees 27 or more years of age	430 "

More detailed information would probably have shown a decline in yield for the oldest trees.

Yields vary considerably from year to year, because of climatic factors, variations in care, use of fertilizer and other factors. A normalized yield, or the average of a period of years, is needed. Yields vary greatly from farm to farm, because of differences in site

quality, operator's skill and managerial ability, and cultural practices. Considerable care is necessary in order to secure reliable yields by age groups. The standard deviation or some other measure of variability should be useful in estimating the degree of reliance to put in group average yields. The effect of prices, climatic conditions and other factors upon yields should be studied.

Total Production

By starting with the number of trees by age groups at a given date, applying the annual loss rate, and correcting for trees planted if these have come into bearing, the number of bearing trees by age groups at any given time can be estimated.[8] Applying the normal yields by age classes to these numbers of trees, total production on a normal basis can be calculated.

On the basis of the scanty data presented earlier, an attempt was made to forecast apple production for the United States for a 20-year period. Each Census of Agriculture, beginning with 1910, has obtained the number of bearing and non-bearing apple trees. By making a few assumptions and applying removal rates computed from data in table 2, it is possible to form some idea of the age distribution of all apple trees in the United States in each census year (table 3). For instance, in 1910 there were 151.3 million bearing and 65.8 million non-bearing apple trees. It is assumed that the latter were all planted after 1900, since a tree 10-years old would, on the average, be classed as bearing. The number of non-bearing trees was divided accordingly as they were planted before or after 1905, on the basis that the general planting rate was downward, and with consideration to apple prices in these years. The 35.8 million trees planted between 1900 and 1905 were from 5 to 10 years old in 1910; by applying removal rates calculated from table 2, there would be 24.9 million remaining in 1915, 20.3 million in 1920, 15.7 million in 1925, and so on. Similar calculations were made for each column. Beginning with 1925, it was not necessary to estimate the plantings by 5-year periods, since the census interval was now 5 years. From 1910 to 1935 the column, "planted prior to 1900," was the residual for all bearing trees not listed under later plantings—plantings fell to a low level in the 1925–30 and 1930–35 periods, and were estimated to remain low until 1945.

[8] If the method is applied to particular varieties, allowance must be made for the possibility of top-working trees, thus converting one variety into another.

Beginning with 1940, estimates had to be made of the total number of apple trees.[9] By that time all trees planted prior to 1900 were at least 40 years of age, so that a removal rate for trees of this age group was necessary. It is at this point that the heavy losses of trees 40 years and older, as shown in table 2, begin to be important.[10]

TABLE 3. ESTIMATED TOTAL NUMBER OF APPLE TREES IN THE UNITED STATES BY DATE OF PLANTING, 1910 TO 1950*

Year	Total apple trees in United States		Trees that were planted									
	Non-bearing	Bearing	prior to 1900	1900 to 1904	1905 to 1909	1910 to 1914	1915 to 1919	1920 to 1924	1925 to 1929	1930 to 1934	1935 to 1939	1940 to 1944
			Millions of trees									
1910	65.8	151.3	151.3	35.8	30.0							
1915	49.4	129.0	104.1	24.9	26.5	22.9						
1920	36.2	115.3	76.6	20.3	18.4	20.2	16.0					
1925	34.3	103.7	58.9	15.7	15.0	14.1	14.1	20.2				
1930	27.5	88.8	40.7	15.2	11.6	11.5	9.8	17.8	9.7			
1935	17.5	82.5	28.0	14.0	11.2	8.9	8.0	12.4	8.6	8.9		
1940	16.5	66.7	13.8	11.7	10.3	8.6	6.2	10.1	6.0	7.9	8.6	
1945	16.5	50.1	3.4	5.8	8.6	7.9	6.0	7.8	4.9	5.5	7.5	9.0
1950		39.6	2.3		4.2	6.6	5.5	7.5	3.8	4.5	5.2	7.9

* See discussion in text for method of estimating and for probable reliability of results.

The result is a drastic decline in numbers of bearing trees, from 1935 to 1950. Such a decline may occur; general knowledge of the industry would raise some doubts about a decline of these proportions. The fact that this decline is determined so largely by the estimate of removal loss in which the least confidence can be placed is also serious. There can be little doubt, however, that by 1940 a large portion of the total apple tree population is getting old. After 1950, a high removal rate of trees 40 years and over would be important, but less so than in the 1935–50 period, when the large numbers of old trees may be in process of liquidation.

Utilizing the estimates of apple trees by age groups, and on the basis of estimates of yield by age of trees, forecasts of apple production until 1960 can be made (figure 1). The result is valuable chiefly

[9] This work was first done about the time the 1940 Census schedules were being taken in the field.

[10] There was no alternative but to apply a 5-year loss rate based upon the 6-year loss rate shown in table 2, in spite of the many uncertainties inherent in a rate derived from two open end classes.

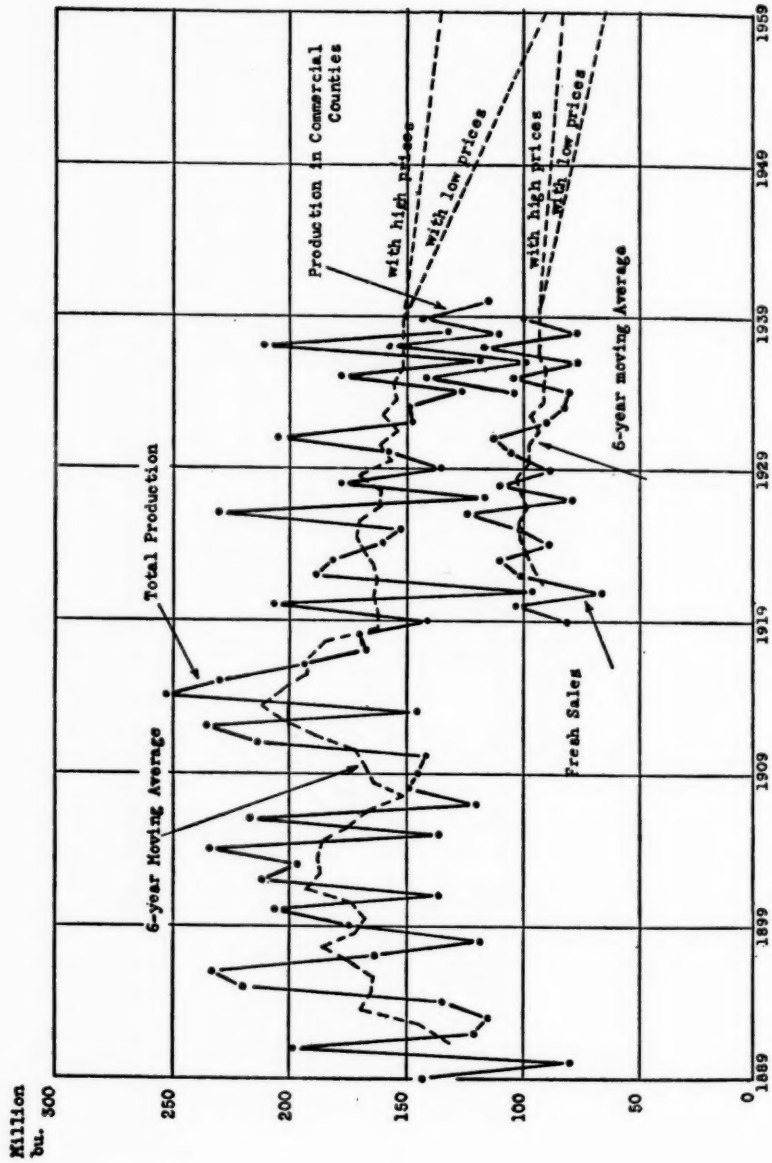

FIG. 1. APPLE PRODUCTION IN UNITED STATES, 1889–1939, AND FORECAST OF PRODUCTION, 1939–1959.

as an illustration of the possibilities of the method. The data on which it is based are inadequate for an accurate forecast. In spite of its deficiencies, however, the estimate of production for the next 20 years is better than the assumption that the volume of production will remain unchanged, which apparently underlies the adjustments made by producers.

Use of Method in Yakima Valley, Washington

The actuarial method can be applied to any area for which data are available, and there is more than one way in which the removal rates and other factors can be estimated. This is illustrated by use of the method in Yakima Valley, Washington.

On the assumption that the number of trees originally planted per acre was the same for the older as for the younger orchards, it is possible to estimate the rate of tree removal (table 4). The chief

TABLE 4. METHOD OF ESTIMATING APPLE TREE MORTALITY BY AGE GROUPS IN YAKIMA VALLEY, WASHINGTON FOR ORCHARDS LEFT IN PRODUCTION

Age of trees in years, 1936	Average age in years	Years between age groups	Trees per acre	Loss of trees per acre between age groups		Annual percentage loss*
				Period	Annually	
1 to 5	3	—	81.2	—	—	—
6 to 9	7½	4½	68.6	12.6	2.80	3.4
10 to 16	13	5½	56.1	12.5	2.27	3.3
17 to 26	21½	8½	50.8	5.3	.62	1.1
27 and over	37†	15½	46.7	4.1	.26	.5

* Based on number of trees per acre at beginning of period.

† Estimated.

Based upon data in "Fruit Trees in Yakima County, Washington," Washington Experiment Station Bulletin 359—March 1938, and upon data in "Washington Tree Fruit Census of 1936," mimeographed reports issued in 1937 by Washington Agricultural Experiment Station and Bureau of Agricultural Economics.

advantage of this method is that it can be used where only one census is available. It is entirely dependent upon a uniform planting rate per acre. It is deficient in that it makes no allowance for orchards removed entirely. Because of the class intervals of the age distribution, direct comparisons cannot be made with results from Eastern orchards. It appears, however, that losses are higher in Yakima prior to (perhaps) 9 years of age, and lower thereafter. Losses in each area reach a low point after trees are 25 years of age. The method employed for Yakima does not result in an increased

loss at older ages, since this largely results from complete removal of orchards.

By use of tree census by ages, removal rates and yields per tree as previously given, and on the basis of estimated planting rates, the production of apples in Yakima County, Washington, was also forecast (table 5).[11] Sharp differences are revealed for different dis-

TABLE 5. INDEX OF ESTIMATED FUTURE PRODUCTION OF APPLES, YAKIMA COUNTY BY DISTRICT, 1936–61*
(1936=100)

Year	Tieton Plateau	Selah Heights	Other Upper Valley	Western Lower Valley	Eastern Lower Valley	Yakima County
1936	100	100	100	100	100	100
1941	115	90	105	94	96	103
1946	120	79	103	84	93	100
1951	93	51	80	58	65	74
1956	68	24	57	33	39	50
1961	39	14	31	23	35	29

* Assuming length of life of standing orchards is 36 years. Data are incomplete on this point. In the original work, calculations were also made for 46 year life of standing orchards.

tricts within the county. The authors feel that the data entering into this forecast were better suited to the purpose than those employed for the United States, and that the results are more reliable. The consequences of a decline to one-third or even to one-seventh of the present production of the major commodity of an area are serious. If it is assumed that the average age at which standing orchards will be removed is 46 years, the declines prior to 1960 will not be so drastic, but the major decrease in volume will come the decade following 1960. The chief question relates to the date of the decline, not to its occurrence or even to its extent.

More Accurate and Complete Data are Needed

This attempt to apply the actuarial method to United States and to Yakima apple production was not wholly satisfactory, due to deficiencies in the data. More nearly accurate data should be available at every stage in the analysis. Sample censuses should be taken at periodic intervals, for representative groups of growers. Information should be obtained on numbers of trees and acreage

[11] Since the method of estimating tree removals makes no allowance for removals of entire orchards, allowance had to be made for this factor.

of trees on a full stand basis, by age and variety groups. Age groupings should not be too wide, nor contain too many trees in the "all over" group. If the sample census is taken at 5-year intervals, the class interval for age of trees should probably be 5 years. Information should also be obtained on the number of trees pulled by age and variety, and the reason or reasons for their removal. This should include dead as well as living trees. Information could also be obtained on trees planted, by varieties and years. Information from producers of planting stock would provide a helpful check on information obtained directly from growers. Plantings might be most numerous in areas not previously growing fruit, or by farmers who had not previously grown fruit. In either case these plantings might be overlooked in a sample survey in producing areas.

Information is needed upon trend in yield associated with age of trees. Average yields for a district may be seriously misleading. Apple yields per tree have been increasing in recent years, but since trees have been getting older, yield per tree of a given age may or may not have been increasing. Fruit or nut yields which are uncorrected for age of trees may be fully as misleading as crude birth rates, which are uncorrected for the age distribution of the population. Information should be collected annually for an adequate sample of orchards, showing yields per tree by age groupings of trees. Not infrequently an orchard will be made up of trees planted all at one time, or of trees planted in only two or three different years. In those cases it should not be difficult to get yields separated by age of trees. Where fruit is all marketed through one agency, and where the records of that agency are intact and available, it should be possible to calculate the past trend in yield with advancing age of trees, and the reliability of this trend.

Most of the information on tree numbers, yield, and production collected in the past was not assembled for the purpose of making long-term forecasts of production. It is not strange, therefore, that it proved inadequate for this purpose. Comparatively small additional expenditures of time and effort would secure information that could be used effectively in making long-term forecasts. Moreover, it is not necessary to wait until suitable data are available for every important producing area in the United States. Information could be collected from, and analyses made for, local areas. In fact, forecasts for the United States should probably be built up from the forecasts of local areas. Trial on a small scale and in nearly

homogeneous areas would provide a valuable test of the method as here outlined, and doubtless would lead to improvements. The fruit industry urgently needs forecasts of a type which it does not receive, but which might be made if a suitable effort were extended.

If funds were available, the necessary data could be collected by rather simple extensions of available procedures in collecting information. Accurate forecasts of future production would enable the fruit and nut industries to make numerous savings, far exceeding the costs of securing and analyzing the necessary data.

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MARGARINE LEGISLATION

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IN THE nineteenth century there were in France, as there always have been in every country, groups of people who could not afford to buy butter. Moreover, in those days long sea voyages without refrigeration facilities resulted in the need for a table fat for the use of sailors which did not become rancid so rapidly as butter. The need for a substitute for butter was recognized by Napoleon III, who offered a prize for the production of a fat which should be as appetizing, nutritious, and stable as butter, and placed a factory in Poissy, near Paris, at the disposal of the person who should invent such a process. In 1870 the French chemist Mége-Mouries was awarded the prize for his work in developing a process which imitated the natural production of butterfat. By 1875 over 300 tons a day of the new product, which we know today as margarine or oleomargarine, were being made in Paris alone. Production was begun in Italy and the United States in 1874, and the first Scandanavian factory began operation in 1876.

The enthusiasm with which margarine was received in Europe was no indication of the manner in which it would be received in the United States. In this country it has been almost from the beginning a center of controversy and the subject of much restrictive and discriminatory legislation. It bears the distinction of being the only food product upon which the federal government has levied a tax. Each step in the progress of margarine toward acceptance as a healthful and desirable product has been taken despite the untiring opposition of perhaps the most powerfully organized group in American agriculture—the dairy interests.

The purpose of this article is to sketch briefly the background of the controversy between the dairy and margarine interests; to outline the state and federal legislation relating to margarine; and to endeavor to reach some conclusions as to what legislation may be justified in a nation which has from the beginning advocated free-

[1] Those sections of the article dealing with the historical background of the margarine controversy and with early legislation are largely based upon information published in, Margarine as a Butter Substitute, by Katherine Snodgrass, Food Research Institute, Stanford University, Fats and Oils Studies No. 4; and in, State and Federal Legislation and Decisions Relating to Oleomargarine, by Anne Dewees, U. S. Department of Agriculture, Bureau of Agricultural Economics.

dom of economic enterprise and opposed governmental interference except in the interest of the national welfare.

Margarine would perhaps have been more readily accepted and have met with less opposition if it had been introduced in the United States at a more opportune time. Manufacture was begun in 1874. The beginning of the industry and its early development could hardly have occurred during a less favorable period. Vast expanses of virgin American soil were being given away by the federal government under the Homestead Act; railroads were being constructed to connect the new farming areas with population centers; refrigeration was being developed; and farm machinery and production techniques were being improved. The result was that the production of agricultural commodities increased much more rapidly than was justified by consumption demands. It could hardly be expected that dairymen would, under the circumstances, be friendly to the introduction upon the market of a substitute for butter.

This period was also characterized by widespread practice of adulteration, misbranding, and various forms of substitution and fraud in the sale of food products. It is certain that large quantities of margarine were sold as genuine butter, but the opponents of this product who endeavored to stigmatize the industry because of this record were no less guilty. There was a need for legislation to prevent adulteration and misbranding, but it was highly inconsistent and illogical that early legislation should be directed almost solely against margarine. The only satisfactory explanation of this is to be found in the political influence wielded by the organized dairy interests. In connection with the Grange movement of the 1870's and the Populist party of the 1880's and 1890's, dairymen were organized into local and state associations which took an active part in all kinds of legislation affecting farmers. In line with public sentiment against adulteration of dairy products they used their influence to obtain legislation aimed directly at margarine as a necessary part of legislation against fraud.

Early State Margarine Legislation

The earliest margarine laws were regulatory state laws designed to prevent fraud. The first laws were enacted in 1877 by New York and Pennsylvania. Maryland followed with a law in 1878. In 1886 seventeen states had such laws. These laws for the most part pro-

vided for proper labeling, fixed penalties for violation, and in some cases required license fees of manufacturers and dealers. This type of legislation proved to be ineffective because of insufficient machinery for administration.

When it became apparent that legislation against fraud would not suppress the margarine industry, the legislative struggle was continued and was more aggressively prosecuted. Existing laws were amended to make them more severe, and some states passed legislation prohibiting the manufacture and sale of margarine. Five states passed laws requiring that any article manufactured in imitation of butter be colored pink. The latter laws became inoperative when the New Hampshire law was declared unconstitutional in 1898, and the prohibitive laws became inoperative when Congress by the Oleomargarine Act of 1886 recognized margarine as a lawful article of commerce. Seven states had prohibitive laws in 1886. Table 1 shows the states which had regulatory and prohibitive laws at the time the federal law was enacted.

TABLE 1. STATUS OF STATE MARGARINE LEGISLATION IN 1886

States having		
Regulatory laws		Prohibitive laws
California	Nebraska	Maine
Connecticut	Nevada	Michigan
Delaware	New Hampshire	Minnesota
Georgia	New Jersey	New York
Indiana	Rhode Island	Ohio
Iowa	Vermont	Pennsylvania
Maryland	Virginia	Wisconsin
Massachusetts	West Virginia	—
Missouri	—	—

Federal Legislation

It was not until after margarine legislation had been widely adopted by the states that the federal law was passed in 1886. In view of the widespread practice of adulteration and misbranding, the need of a carefully framed federal law to prevent fraud in the handling of foods and to insure purity in their manufacture came to be quite widely recognized. The need for such a law is expressed in the following quotation from the Annual Report of the Agricultural Chemist for 1879:

"During the present year, as in the past, the department has been called

upon to decide whether the samples submitted for examination were true butter or artificial imitations thereof. Several samples that proved upon analysis to be oleomargarine had been sold for veritable butter, while others were sold under their proper name. . . . This whole matter has been thoroughly tested in English courts; the law there makes it a misdemeanor to sell any article of food, drink, or medicine under any false or misleading name. A law carefully framed, is greatly needed in this country, where adulteration and substitution are every day practiced."[2]

As early as 1879, resolutions and petitions on the subject of food adulteration and misbranding were received, and numerous bills were introduced in Congress. Some of these were designed to prevent all types of adulteration and fraud in the sale of foods, but more of them were aimed specifically at butter substitutes. Such legislation was first seriously considered, however, by the Forty-Seventh Congress, which was in session from December 1881 to March 1883. Efforts for legislation concerning food and drug adulteration and misbranding in general and against margarine in particular were renewed during the session of the Forty-Eighth Congress, but no legislation was enacted.

In February 1886, a convention of dairy interests from twenty-six states was held in New York. As a result of this convention, a nation-wide campaign to place the dairy industry on "an equal footing with its dangerous competitors" was inaugurated. Following this campaign, petitions were received by Congress from all parts of the country. As a result, there were introduced in the Forty-Ninth Congress some twenty-one bills on food adulteration and misbranding. Sixteen applied specifically to substitutes for butter. Half of these provided for a tax on the manufacture and sale of substitute products; the rest merely provided for regulation. Although most of the bills contained tax provisions, they were referred to the Committee on Agriculture which was favorable to the dairy interests.

The bill as it was originally sponsored by the Committee on Agriculture provided for annual license fees amounting to $600 for manufacturers, $480 for wholesalers, and $48 for retailers, and for a manufacturing tax of ten cents a pound. The controversy centered about the tax provision of the bill. Those who favored a ten cent tax admittedly wanted to stamp out the margarine industry.[3] The

[2] Report of the Commissioner of Agriculture, 1879. P. 77.
[3] H. C. Bannard, The Oleomargarine Law. Pol. Sci. Quar., 2: 551–552.

House would not sponsor a tax of this amount and reduced it to five cents before passing the bill. The act as finally approved included definitions of butter and of margarine; special taxes for manufacturers, wholesalers, and retailers of margarine amounting to $600, $480, and $48, respectively; a manufacturing stamp tax of two cents a pound; and penalties of fine or imprisonment in case of failure to obey the law

Since passage of the federal law in 1886, two amendments relating to colored margarine have been enacted. In 1902 the stamp tax on margarine designated as "oleomargarine free from artificial coloration that causes it to look like butter of any shade of yellow" was reduced to one-fourth cent a pound, and that on artificially colored margarine was fixed at 10 cents a pound. Dealers' license fees were also adjusted to discriminate against the sale of colored margarine. These fees were placed at $200 for wholesalers and $6 for retailers handling uncolored margarine.

It was thought that if the sale of colored margarine could be suppressed the product would be eliminated from the market. In the margarine industry, however, the will to survive was strong, and beginning about 1909 manufacturers began to use oils which naturally imparted a yellow color to the product. The margarine people contended that the color obtained in this process was not "artificial color" and therefore the 10 cent tax did not apply. This interpretation was upheld by the courts. As the product colored as a natural result of the ingredients which it contained appeared on the market, those responsible for the administration of the law were faced with a situation which made it necessary for them to determine whether yellow margarine offered for sale was naturally yellow or colored by the addition of artificial coloring before applying the tax. Congress was asked to clarify legislation on the subject, and this provided the opportunity for the final blow at yellow margarine. In 1931 the 10 cent tax was placed upon all margarine exceeding 1.6 degrees of yellow.

During the period January 1 to April 15, 1941, several bills which would affect margarine were introduced in Congress, and referred to the Committee on Agriculture. One of these would impose a tax of 10 cents a pound on both colored and uncolored margarine; another would prohibit the manufacture, importation and sale of all margarine.

Recent State Tax Legislation Affecting Margarine

After the federal amendment of 1902 there was a lull in state margarine legislation for about twenty years. During this time, however, some important court decisions were rendered. These decisions had to do with the taxation feature of the federal law. Although the Supreme Court had in the case of the New Hampshire law requiring that butter substitutes be colored pink rendered its decision on the basis of the purpose underlying the law, it declined to examine the underlying purpose of legislation which on the surface appeared to be tax legislation. It was the attitude of the court that the fact that it might consider a tax oppressive or even destructive in its effect did not justify it in attempting to limit or control the discretion of Congress in its exercise of the taxing power. The 1902 amendment to the Oleomargarine Act was upheld as a valid exercise of this power.

Many states, and particularly the dairy states, have taken advantage of this stand taken by the Supreme Court and have used the taxing power to restrict the sale of margarine or to exclude it entirely. This action is a part of the mass of discriminatory legislation designed to protect "home" industries which has been enacted by the states largely since 1929. Some twenty-three states have adopted excise taxes on margarine ranging from 5 cents a pound on uncolored to 15 cents a pound on colored, or on all margarine. These states fall into three groups according to the types of margarine subject to taxation. The group having the severest laws is that which levies a tax on all margarine. This group includes eight states. A second and much smaller group discriminates against margarine which does not contain at least a specified minimum percentage of animal fats. Nebraska, Minnesota, and Wyoming comprise this group. The third group, consisting principally of Cotton Belt states, but including Maine, Kansas, and Florida, have laws which exempt from taxation margarine made of beef fat, pork fat, corn oil, peanut oil, soy bean oil, cottonseed oil, and milk fat. It will be seen at once that under these laws no margarine made of domestic fats and oils is taxed. It is obvious that such laws are directed at margarine made of imported oils and fats other than those exempted. They act as interstate trade barriers only to the extent that they discriminate against manufacturers who produce margarine from imported oils and fats. Those laws which tax

margarine made of domestic oils and fats discriminate not only against the manufacturer but also against the American farmer who produces the raw materials. Wisconsin, Washington, North Dakota, South Dakota, Wyoming and Oklahoma, have the most restrictive laws.

Fifteen states require license fees of those engaged in the manufacture, distribution, sale, or serving of margarine. These fees range from $1.00 to $1,000 a year. Montana, Pennsylvania, and Wisconsin require the highest license fees. State margarine excise tax and license rates in the United States are presented in table 2.

The legislatures of 43 states have been in session during the early part of 1941, and 15 adjourned prior to April 15. In 19 states 29 bills affecting margarine have been introduced, and in two states bills of reprisal against states which tax food products made of cottonseed, peanut, or soy bean oils have been introduced. The Georgia legislature adopted a resolution memorializing the Washington legislature to kill a bill which would have placed a tax of six cents a pound upon the use of margarine in Washington and have licensed users thereof at the rate of $1.00 per year. The resolution further memorialized the Washington legislature to remove the present tax levied on margarine by that State. The Washington bill died with adjournment of the legislature. On the other hand, there was introduced in the New York legislature a resolution which would have memorialized Congress to enact a federal law levying on margarine an excise tax equal to the difference between the cost of producing margarine and the cost of producing butter. This resolution died with adjournment of the legislature. Of the 29 bills introduced, 14 have been abandoned, defeated, or killed, or have died with adjournment; 7 have been passed and approved; and 8 were still under consideration as of April 15.

Twenty bills concerned the levying of taxes or license fees on margarine or articles sold for making artificial butter, or provided for the repeal or amendment of such provisions in present laws. Ten of these bills have been killed, abandoned, or defeated, or have died with adjournment; 5 have been passed and approved; and 5 were still under consideration as of April 15. The 5 bills which have been enacted into law include the exemption of margarine made exclusively of domestic oils and fats from the 10 cent tax formerly imposed by Tennessee; the repeal of the New Mexico domestic fat

margarine law; and the exemption of margarine from state retail sales taxes in North Carolina and West Virginia. North Dakota passed a law taxing articles sold for the purpose of making imitation butter.

Bills concerning the taxation of margarine which were still being considered as of April 15, 1941, included two bills in Michigan, one

TABLE 2. STATE EXCISE AND LICENSE TAXES ON MARGARINE, YEAR OF ENACTMENT AND EXCEPTIONS*

	Per pound excise tax			License taxes			
State	Colored	Per pound tax	Exceptions to tax	Retailers	Wholesalers	Manufacturers	Restaurants boarding H. consumers
Ala.	prohibited	10 (35)	Dom.	—	—	—	—
Ariz.	—	—	—	—	—	—	—
Ark.	prohibited	10 (35)	Dom.	—	—	—	—
Calif.	"	—	—	(23) 5.00	50.00	100.00	2.00
Colo.	—	10 (33)	Dom. S.B.	(31)	25.00	25.00	—
Conn.	prohibited	—	—	(33) 6.00	50.00	100.00	3.00
Del.	"	—	—	—	—	—	—
Fla.	"	10 (35)	Dom.	—	—	—	—
Ga.	—	10 (35)	Dom.	—	—	—	—
Idaho	prohibited	5 (31)	—	(29) 50.00	200.00	—	—
Ill.	—	—	—	—	—	—	—
Ind.	—	—	—	—	—	—	—
Iowa	prohibited	5 (31)	—	—	—	—	—
Kans.	—	10 (33)	Dom. S.B.	—	—	—	—
Ky.	—	—	—	—	—	—	—
La.	—	12 (34)	Dom.	—	—	—	—
Me.	prohibited	10 (35)	Dom.	—	—	—	—
Md.	"	—	—	—	—	—	—
Mass.	"	—	—	(36) Local sellers registration fee 50¢			
Mich.	"	—	—	—	—	—	—
Minn.	"	10 (33)	Dom. (A)	(31) 1.00	1.00	—	—
Miss.	—	—	Dom.	(20) 10.00	(32) 100.00	—	—
Mo.	prohibited	—	—	—	—	—	—
Mont.	"	—	—	(25) 400.00	1000.00	—	—
Neb.	—	15 (31)	Dom. (A)	(25) 1.00	25.00	100.00	—
Nev.	—	—	—	—	—	—	—
N.J.	prohibited	—	—	—	—	—	—
N.H.	"	—	—	—	—	—	—
N.Mex.	—	—	—	—	—	—	—
N.Y.	prohibited	—	—	—	—	—	—
N.C.	"	10 (35)	Dom.	—	—	—	—
N.Dak.	"	10 (31)	—	(31) 2.00	5.00	15.00	—
Ohio	"	—	—	—	—	—	—
Okla.	"	10 (31)	—	(31) 5.00	10.00	10.00	2.00
Ore.	"	—	—	—	—	—	—
Pa.	"	—	—	100.00 (1899)	500.00	1000.00	10.00 50.00
R.I.	—	—	—	—	—	—	—
S.C.	prohibited	10 (34)	Dom.	—	—	—	—
S.Dak.	"	10 (31)	—	—	—	—	—
Tenn.	—	10 (31)	Dom.	(41) 5.00	75.00	300.00	—
Texas	—	10 (34)	Dom.	—	—	—	—
Utah	prohibited	5 (29)	—	All sellers	5.00	—	—
Vt.	"	—	—	All sellers	25.00	—	—
Va.	—	—	—	—	—	—	—
Wash.	prohibited	15 (31)	—	—	—	—	—
W.Va.	"	—	—	—	—	—	—
Wis.	"	15 (35)	—	(31) 25.00	500.00	1000.00	1.00 25.00
Wyo.	"	10 (31)	Dom. (A)	—	—	—	—

* This table is, with the exception of minor revisions based on more recent information, comprised of data included in the testimony of Mr. C. H. Janssen, President, National Association of Margarine Manufacturers, before the Temporary National Economic Committee during hearings on interstate trade barriers, March 19, 1940. Numbers in parentheses indicate year in which tax was enacted.

of which would levy an excise tax of 5 cents a pound and impose license fees of $10 on manufacturers and wholesalers and $2 on retail dealers, and the other would impose a tax of 10 cents a pound and require of manufacturers and wholesalers license fees of $100; a bill which would impose a tax of 10 cents a pound on margarine made from foreign fats and oils sold in Missouri; and a bill which would relieve margarine made of domestically produced oils and fats from existing statutes in Oklahoma. Oklahoma is the only remaining Cotton Belt state taxing margarine made of domestic fats and oils.

Wisconsin has the most drastic margarine legislation. A tax of 15 cents a pound is levied on all butter substitutes sold, exposed or offered for sale, given away, delivered, or used in Wisconsin. Moreover, the following license fees are required: manufacturer, $1,000; wholesaler, $500; retailer, hotels, and restaurants, $25; boarding houses, bakers, and confectioners, $5; and license to consume margarine not purchased from a licensed retailer in the State, $1. The practical effect of this legislation has been to exclude margarine from the State. According to the 1935 Business Census there were 10,401 retail food stores, or potential margarine dealers, in Wisconsin; Annual Reports of the Collector of Internal Revenue show that in 1930 there were 5,191 licensed retail margarine dealers in the State. In 1931 license fees were required of dealers and in 1932 an excise tax of 6 cents a pound was levied. The number of licensed retail dealers in 1932 was 911. In 1935 the excise tax was increased to 15 cents a pound, and in 1939 no licensed dealers were reported. In the year ended June 1930, there were manufactured in Wisconsin 9,000,000 pounds of margarine. The schedule of license fees required of manufacturers was imposed in 1931, during which year production fell to less than 6,000,000 pounds. No margarine production has been reported from Wisconsin since 1931.

Although such laws thus far have been held to be within the taxing power of the states, in many cases the rates imposed are so high that trade in the commodity is destroyed and the levy has the regulatory effect of a protective tariff rather than the revenue producing characteristic of a tax. Furthermore, like a tariff, such laws arouse resentment in the states whose products are discriminated against, and retaliatory measures often follow. The Wisconsin law particularly has resulted in expressions of resentment and threats of reprisal, as well as more tangible evidences of opposi-

tion, in the South. For example, there was introduced in the Texas legislature on February 20, 1941, a bill which would impose a tax of 20 per cent of the wholesale price of paper towels sold in the State of Texas. Practically all paper towels used in this country are manufactured in Wisconsin. In March, 1941, there was introduced in the Arkansas legislature a bill which would have imposed a tax on the products of those states which tax food products made from cottonseed oil, peanut oil, or soy bean oil. The Arkansas bill died with adjournment and the Texas bill had not been passed as of April 15, but such bills indicate the feeling that has been aroused, and if the dairy states persist in discriminating against the products of the South it may be expected that the demand for retaliatory measures will increase. During the five-year period 1935–1939, inclusive, cottonseed oil constituted an average of 41 per cent of all fats and oils used in the manufacture of margarine in the United States. Since cottonseed oil is by far the most important ingredient, it is not difficult to understand the objections of the hard-pressed cotton grower to legislation which restricts the development of this potential market for one of his products.

Other Recent State Legislation

State margarine legislation is by no means confined to the imposition of excise taxes and license fees. Two-thirds of the states prohibit the sale of yellow margarine, and some twenty states prohibit the use of butter substitutes in state institutions, excepting penal institutions in some cases.

Great confusion exists in state legislation relating to the marking or labeling of margarine. Extreme variations appear in such requirements as the location and size and type of lettering used on containers. Some states have labeling laws which in addition to making the contents easily recognizable apparently are designed to make the packaging as unattractive as possible. In this connection, one state requires that a black band at least three inches wide be painted around the container. Another state requires the use of labels painted with lamp black and oil on all containers of butter substitutes.

Can Special Margarine Legislation be Justified?

Writing in 1887, the year following the passage of the Federal Oleomargarine Law, Henry C. Bannard said that passage of the

law was effected by a union of groups having three different points of view: (1) those who wanted to suppress a food they believed to be foul in its nature and harmful to the public health, if not actually a poison; (2) those who desired to prohibit the sale of any article competing with butter; and (3) those who desired legislation against the fraudulent sale of margarine as genuine butter. It is believed that any group advocating margarine legislation today would be made up of persons having points of view falling within similar classifications. A consideration of these points of view should, therefore, be helpful in reaching some definite conclusions as to what margarine legislation is really needed.

Nutritional considerations.—The belief that margarine is directly injurious to health or poisonous has not been held by any significant number of people for many years. As a matter of fact, it would seem that margarine from the beginning was held by leading chemists to be a wholesome and nutritious article of food. The following statement taken from the Annual Report of the Agricultural Chemist for 1879 is an example of this viewpoint:

"It must be admitted that carefully prepared oleomargarine is superior to poor butter as regards taste, odor, and healthfulness; at the same time, it is hardly probable that it will ever be preferred to butter of good quality. . . . There can be no valid objections urged against the manufacture and sale of good oleomargarine if no deception is practiced upon the buyer."[4]

As early as 1881 Professor C. F. Chandler, of the Department of Chemistry, Columbia University, was directed by the Board of Health of New York City "to investigate the subject of oleomargarine." In his report Professor Chandler said in part:

"The product is palatable and wholesome, can be made of uniform quality the year round, is in every respect superior as an article of food to a large proportion of dairy butter sold in this city, and can be manufactured at a much lower price. I regard it as a most valuable article of food and consider it entirely unexceptional in every respect. In this opinion I am supported by the best scientific authorities in the country. . . . I would further say that this question is one on which there is no difference of opinion among scientific investigators familiar with the chemistry of dairy products and fats. I have never seen a statement emanating from any person having any standing among scientific men in which a contrary opinion is advanced."[5]

Before the Federal Oleomargarine Law was passed in 1886 Con-

[4] Report of the Commissioner of Agriculture, 1879. P. 77.

[5] U. S. Department of Agriculture, Division of Chemistry, Bul. 13, Food adulterants. Part First—Dairy Products. P. 19.

gress conducted hearings to determine whether or not the product was a wholesome one. Professor Chandler's testimony before the Senate Committee on Agriculture pending consideration of the bill was much the same as that presented in his report to the New York Board of Health. The fact that the law was passed is evidence that Congress was convinced there was nothing in margarine to make it injurious to the public health, for the law recognized the product as a lawful article of commerce. The first year's experience with the law served as a further demonstration of the wholesomeness of the product. The act was filled with provisions for condemning and confiscating unwholesome margarine, yet during the year following its passage not a pound fell under the penalty.[6]

The majority of those who now object to margarine as being injurious to health claim that injury results from the fact that it lacks certain vitamins which are present in butter. Specifically these are vitamins A and D. This difference was, of course, unknown at the time the federal law was enacted. To recognize such a difference, however, is by no means to conclude that margarine is harmful or that butter is indispensable. According to a study conducted by the Food Research Institute, Stanford University, the optimum American diet from a nutritional point of view consists of "two fractions, one which may be considered and demonstrated as indispensable, the other as supplementary. . . . The indispensable components are milk and certain fruits and vegetables, especially the leafy vegetables, milk furnishing perhaps two-thirds of this amount and the fruits and vegetables one-third. The other fraction of the diet contains the meats, cereals, legumes, carbohydrates, and oils and fats necessary to supplement the components of the indispensable fraction, and in particular to supply the heat units required to sustain the temperature of the resting body and support muscular exertion. . . . In the indispensable group of foodstuffs the range of riskless variation is narrow; but in the supplementary group there is a wide range. Indeed, it may fairly be said that, if the indispensable components of the diet are adequately provided, other foods may be elected freely on the basis of custom, taste, and price, without fear of nutritional ill effects."[7] It cannot correctly be said, then, that butter is essential

[6] H. C. Bannard, The Oleomargarine Law, Pol. Sci. Quar., 2: 549.
[7] Katherine Snodgrass, Margarine as a butter substitute. P. 162.

to the diet from the standpoint of the vitamins which it contains. The primary function of butter is to provide fat, one of the necessary components of the diet. This function can be performed equally well by margarine, for in caloric value it is equal to butter pound for pound, and both fats have been found to be 97 per cent digestible.

No doubt the most potent influence the dairy people have used in obtaining legislation against margarine has been their claim that butter is essential from a nutritional standpoint. The situation upon which they have based their argument, however, no longer exists. The vitamin content of butter varies with the time of year and kind of feed fed to dairy cows, and normally vitamin content is lowest during the winter months when it is needed most. Margarine now can be made not only wholesome and palatable but also to contain vitamins A and D uniformly in any amount desired. Since 1938 several American manufacturers have been producing margarine fortified by these vitamins, and it may be expected that this will become a general practice in the near future. Those manufacturers producing vitamin fortified margarine follow the practice of adding sufficient vitamin concentrate so that the finished product will contain not less than the average vitamin content of butter.

Shall one commodity be suppressed to the advantage of another?—The ideal marketing situation, and one which has been closely approached at least during a considerable part of American history, is one in which any healthful and honestly described product acceptable in one market is acceptable in any other market without discrimination because of location of the producer or because it may compete to some extent with a "home" product. In other words, it is generally expected that a product will be placed on the market and that consumers will be permitted to accept it or reject it upon its own merits without any unnecessary artificial handicap being placed upon it. As consumers, we think of the United States as one great market available to all alike, with only such regulation as may insure fair play and the best interests of the general public. It is not in accordance with what is usually thought of as American policy that one group should receive an advantage through legislation at the expense of another group. Such a situation is certainly undemocratic.

The initiative and leadership in the battle against margarine have been supplied by that group which desires to prohibit the sale

of any product which competes with butter. This group has been able to marshal under its banner so much strength that Congress has bowed to its will and singled out margarine from among all the food products of the land and levied a tax upon it, and has prohibited the use of money appropriated for certain federal institutions and agencies for the purchase of margarine except for use in cooking. Having been unable to prohibit the sale of margarine, it has by the exercise of its influence upon the legislatures of a number of states been able to obtain special margarine tax legislation which has the effect of increasing the cost of this product to a point where the only choice the consumer has is whether he will take butter or margarine at the same price.

A tax on margarine falls almost completely upon those who are least able to bear it. It has been estimated that almost two-thirds of American families have incomes of less than $1,500 annually and that the average annual income for this group is $826. According to a study conducted by the Bureau of Agricultural Economics, families having a weekly income of $4.00 or more per adult or adult equivalent buy practically no margarine. This means that all margarine taxes are paid by families having weekly incomes of less than $4.00 per adult or adult equivalent. As income decreases below $4.00 the ratio of margarine purchases to butter purchases increases and the tax burden becomes heavier and heavier. An examination of these facts leads to the conclusion that butter and margarine serve different and rather clearly defined sections of the population and that the line between these sections varies with the relation of butter prices to income. In other words, consumers who feel they can afford it buy butter, and those who do not feel they can afford butter buy margarine or supplement margarine with butter as their means will permit. In order for butter to gain any considerable part of the margarine market, it would seem that the price of butter must be reduced so that those who now buy margarine will feel they can afford to buy butter.

If it is to be the policy of the state and federal governments to tax one commodity simply because it competes with another, why limit such protection to the butter interests? No group has suffered more from the development of substitutes than the cotton grower, but no one has proposed that synthetic yarns be taxed to give him protection. The heart of the matter is not simply that margarine competes with butter but that it can be produced more cheaply.

This is the real reason for the strenuous efforts of the people producing butter to suppress the industry. They have endeavored to develop in the minds of consumers and legislators the belief that margarine is unhealthful and that because of its cheapness it is an inferior product, and they have not always been particular about the means used to obtain the ends which they sought. In regard to the samples of margarine submitted by the butter interests for analysis during consideration of the Federal Oleomargarine Act in 1886, Bannard says: "Subsequent developments make it absolutely certain that these samples must have been unfairly and unscrupulously concocted by the lobby that clamored for the passage of the bill."[8]

Regulation to prevent fraud.—It is evident that the butter interests have no basis for demanding the restriction of the sale of margarine because of nutritional deficiencies, and to burden this product with discriminatory taxes and license fees is clearly not in accordance with the doctrine of equality of economic opportunity. Those who hold the third point of view mentioned by Bannard do not desire to restrict the sale of margarine at all, so long as it is sold upon its own merits, but they do desire to prevent deception and fraud. Every fairminded and unprejudiced person would certainly favor such legislation and regulation as is necessary to prevent the sale of margarine, or any other product, as anything except what it actually is. The question is, then, is the great mass of present special state and federal margarine legislation necessary to prevent fraud in the sale of margarine? Are margarine manufacturers so much more unscrupulous than other food manufacturers that in addition to the pure food law administered by the Food and Drug Administration a special oleomargarine law administered by the Bureau of Internal Revenue is necessary to prevent them from the practice of deception? It can hardly be said that margarine is more susceptible to the practice of substitution and fraud than such products as butter, cheese, lard, spices and condiments, tea, coffee, cocoa, and the like, which are not subjects of special legislation.

The need for a law to prevent adulteration and misbranding in the manufacture and sale of foods, drugs, and liquors was recognized at least as early as the 1870's. A general law for this purpose was the desire of many when Congress first began to consider demands for margarine legislation. There can be no doubt but that

[8] H. C. Bannard, The Oleomargarine Law, Pol. Sci. Quar., Dec. 1887.

the political influence of the dairy interests was responsible for limiting the law of 1886 to margarine. It was not until 1906 that "An act for preventing the manufacture, sale, or transportation of adulterated or misbranded or poisonous or deleterious foods, drugs, medicines, and liquors, and for regulating traffic therein" was passed. The law made the manufacture of adulterated or misbranded foods, and drugs a misdemeanor, fixed penalties of fine or imprisonment or both for violation of the law, and defined adulteration and misbranding within the meaning of the act. Since 1906 this law with amendments has been in force, and most, if not all, states have enacted laws dealing with the same problem. Under the federal law a definition and standard of identity for margarine has been promulgated in order to promote honesty and fair dealing in the interest of consumers. These laws should satisfy any reasonable persons who wish to see the public protected from adulterated or deleterious foods and those who desire legislation against fraud. There remains only those who desire to suppress margarine because it competes with butter, or to stifle such competition by taxation. Whether or not this type of legislation is to continue to be tolerated is, of course, a decision which the people must make through their representatives in Congress and in the state legislatures.

Summary

The process by which margarine is produced was discovered in an effort to make available to low income groups an article of food as nearly like butter as possible at a price which they could afford to pay. The product was introduced into the United States during a period of agricultural surplus, which made it most unwelcome to the dairy interests. This period was also characterized by widespread adulteration and misbranding of foods, and considerable quantities of margarine were sold as genuine butter. When public sentiment was aroused against adulteration, the dairy interests took advantage of the influence which organization gave them to discredit margarine, and endeavored to suppress it. These efforts first took the form of state laws to prevent fraud. Seventeen states had such laws in 1886. When this type of legislation failed to suppress the industry, probibitive laws and such laws as those enacted by New Hampshire, Vermont, Minnesota, West Virginia, and South Dakota requiring that artificial butter be colored pink were resorted to. Federal legislation was enacted in 1886 after state legislation

had become quite general. The passage of the federal law gave recognition to the product as an article of commerce, and prohibitive laws became inoperative. The Supreme Court rendered a decision against the New Hampshire law requiring that butter substitutes be colored pink, on the basis that it was in effect prohibitive legislation. The court, however, refused to examine the underlying purpose of legislation which appeared on the surface to be tax legislation. This stand opened the way for the more recent legislation which makes use of the taxing power of the states to restrict or destroy the sale of margarine. Since the courts have declined to examine the purpose of such laws, consumers of the various states are entirely dependent upon their legislatures to protect their interests.

All margarine legislation has been the result of demands of one or more of three groups: (1) those who want to suppress a food they believe to be harmful to the public health, (2) those who wish to prohibit the sale of any article that competes with butter, and (3) those who desire legislation against the fraudulent sale of margarine as genuine butter. The first and third of these groups should be satisfied with the pure food laws. The second group has no more real justification for its demands than has any other group whose product is sold in competition with that of another group.

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INDEXES ON A TYPE-FARM BASIS*

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INDEXES of prices received by farmers and of prices paid by farmers, indexes of scale of agricultural output, and indexes of gross cash income are available for the nation as a whole.[1] To some extent (and for briefer periods) such indexes are also available for groups of states characterized by relatively homogeneous output of product (the "corn belt," the "small grains area." etc.).[2] Increasingly, indexes for various states have been constructed.[3] These are usually computations of prices received by farmers. In all cases, the areas to which the measures apply are demarcated on some legal basis, generally the state and national boundaries (which also segregate data-collecting activities). Such procedure, moreover, has the additional convenience of definition by boundaries which have remained unchanged throughout the period under examination. However convenient such bounds for these measures, it is nevertheless generally recognized that legally-defined units may delimit very imperfectly those areas in which agriculture is homogeneous. In so far as homogeneity is necessary for pertinent utilization of series of

* The work reported here was undertaken at the suggestion of Professor John D. Black; indeed, it is part of a larger project relating to the New England economy which he is conducting at Harvard University. Early in the work, I benefitted much from discussion with Messrs. Sherman Johnson, M. R. Cooper, Emil Rauchenstein, W. D. Goodsell, and A. P. Brodell, of the Division of Farm Management and Costs, United States Department of Agriculture. In the vast amount of technical work and computations involved, I was assisted by H. C. Norcross, Nora Boddy, and Catherine Corson. To Mr. Norcross particularly thanks are due for his painstaking work in the technical task of farm budgeting. The Harvard Committee on Research in the Social Sciences provided funds and facilities for the conduct of most of this research. The Work Projects Administration provided some of the clerical assistance needed.

[1] Primarily these have been constructed and made available by the Bureau of Agricultural Economics. See also, Frederick Strauss, and L. H. Bean, Gross farm income and indices of farm production and prices in the United States, 1869–1937, U.S.D.A. Tech. Bul. 703, Washington, D. C., December 1940.

[2] R. G. Bressler, Jr., and J. A. Hopkins, Trends in size and production of the aggregate farm enterprise 1909–36. Nat. Res. Proj. Rep. A-6, Philadelphia, July 1938.

J. D. Black (Editor), Research in agricultural income, Scope and Method Bul. 6, Soc. Sci. Res. Coun., New York, June 1933. (See pages 57–95.)

[3] J. D. Black and B. D. Mudgett, *Research in agricultural index numbers*. Scope and Method, Bul. 10, Soc. Sci. Res. Coun., New York, March 1938. (See pages 81–109.) " . . . A total of 31 of the 48 states now have such series back to 1910 or almost there. In addition, 3 states have 2 such series, and Cornell University is preparing series in 3 states, one of which has no other series. Also 4 other state series are in process of development." (*Ibid.*, p. 116.)

prices, quantities, and incomes, computations defined by national, state, or even county, lines may prove to be inadequate. We need measures which segregate the developments in meaningful components of the agricultural picture, so that we can compare them at one point in time and even examine their relative movements over time. Moreover, unless unusual homogeneity exists in a certain area, we must have for it more than one such measure, each applicable to different developments which are taking place side by side. Thus in the Providence area of Rhode Island, we find specialized dairy and specialized poultry farms (among others), which cannot be separated geographically. Figures for net returns for example, computed for the area as a whole, are really summaries of the net returns on all the different types in that area. Each of these may well differ from the others; this is true also for their course of movement over the years. For such purposes as description, analysis, planning and program implementation, it is these diverse movements in net returns (as well as the figures for prices and scale of operation, and the like, corresponding to them) which must be examined.

Our type-farms do provide basis for such measures. They are constructed on functional rather than areal lines and characterize the region in terms of units which are meaningful both to the farm management technician and specialist and to the farmers and people living there. Since this basis is an adaptable one—indeed it keeps adjusting itself to the influences operating about it—we at the same time emphasize its rôle as a component of the larger economy. So constructed, they provide a moving picture of the area and its agricultural developments, all in terms of workable farm units. Increasingly, for example, the Agricultural Adjustment Administration, the Soil Conservation Service, and the Farm Credit Administration have found it necessary to consider more than on an area basis the characteristics of the region in which they were operating or were about to operate. Perhaps their need basically is an individual farm approach such as used by the Farm Security Administration. Our type-farm would permit ready and close approximation to a task which becomes increasingly large as the extent of operations of these agencies is expanded or intensified. Our net income index, which is a measure of variations in the amount available for living and for paying debt, would provide a valuable means by which credit agencies could estimate and compare the debt-bearing capac-

ities of different kinds of farms over the years. They might even provide a basis for instituting a scheme of variable repayments without resorting to the use and study of each individual farm budget.[4]

In this article there is presented a practical procedure for isolating suitable bases for computing such measures. Series of price, quantity, and income indexes can thus be constructed which are characterized by a homogeneity not found in the usual computations. Illustrative results of such computations are also presented. These were selected from a large number now available for the New England states.

The Type-Farm Concept

The fundamental concept is what we shall call a type-farm. Its construction involves classification of data collected for actual farm organizations and the use of certain modal measurements obtained in this way. At the start, therefore, one general qualification must be stated. This kind of procedure would preclude application to regions in which such heterogeneity exists that, over the years, no meaningful type can be isolated. How many areas will be characterized by such heterogeneity depends of course upon our definition of "type." Certainly the larger the number of criteria according to which modality conditions must be fulfilled, the less the possibility of effective breakdown into groups. Thus, if we use number of cows as the sole basis for classification in an area, we might readily find that the frequency distribution of the farms has a mode at 10 cows; if we set the criteria both for number of cows and acres of pasture, however, it will be less likely that there be a unimodal frequency surface. Similarly, as we add such characteristics as number of man-work units available, size and nature of the secondary enterprises, and so on. In view of the fact that for our purposes it will be necessary to define a typical farm enterprise in all the detail found on an individual farm unit, a very large number of classification criteria is involved. Hence the regions to which our procedure is applicable would appear to be definitely limited. Yet it is true that for an area characterized by such variations as are found in New England, types were isolated which prove most useful even for

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[4] See J. K. Galbraith, R. M. Macy and W. Malenbaum, Farm mortgage loan repayment, JOUR. FARM ECON., August, 1937.

descriptive purposes.[5] For in truth there are few agricultural areas which the inhabitants themselves cannot characterize in terms of relatively few kinds of farming units. In one region it may be 10-cow farms and 25-cow farms; somewhere else small potato farms and large potato farms; still elsewhere, a Polish tobacco farm of family size and other tobacco farms. Or indeed, many of these may be found in the same area. So long as we recognize first, that one area may be characterized only in terms of several farm types existing side by side, and second, that the criteria for classification may, and indeed will, vary from area to area, there will generally emerge type setups suitable for the purpose of index number computation and the subsequent use of these figures. Furthermore, we readily grant that there will always exist farm organizations in every region which defy classification within any of our types for the area. In most cases, this residual should prove to be small. (The procedure to be discussed will probably cover these organizations at least during some years of the period.)

The concept of the type-farm can best be visualized from the following exposition of its derivation under admittedly unreal assumptions with respect to data availability. Let us assume indeed that, for every year for which index numbers (on an annual basis) are to be computed, we have farm account records for each farm in a region. This region may be a type-of-farming area; it may be some legally-bounded area relatively homogeneous with respect to agriculture; preferably it would be a community defined so that its inhabitants recognize it as some kind of distinct area. In truth, no great importance need be attached to the precise delineation of the region if only it is bounded so as not to separate obviously similar areas. Moreover, it is important that all these regions sum to the whole territory (a state, the New England states, etc.) if a complete coverage of the agriculture in such a territory is desired. We also assume the account record is such that a complete picture of the farm is obtained as well as the data adequate for a full budget. There would be information on the farm family as well as on the physical plant. Receipts and expenditures (both quantities and prices, where pertinent) would be given in enough detail so that an

[5] For a good discussion of the fundamental difficulties of categorization of farms into any type organization, see I. G. Davis, Types of farming and type of farming areas in Connecticut, Bul. 213, Storrs Agr. Exp. Sta., Storrs, 1932; also, W. W. Wilcox, Types of farming research and farm management, JOUR. FARM ECON., May 1938, 20: 417–429.

analyst familiar with the area could readily visualize the farm practices pursued. Or instead, we can assume that all the yields on the one hand, and the various input factors on the other, are also available.

The farms of a region in each year are then classified. Principal basis for classification should be the distinctions made in the region by the farmers themselves in the year to which the data are applicable. Thus, in 1920, the first criterion for classifying farms in the Enosburg area in northern Vermont would be on a basis of cow numbers. The distribution in 1920 would show very distinct peaks at 14 cows and again at 28 cows. In central Aroostook county, on the other hand, basis for breakdown would be acreage in potatoes. In that year, farms tended to group about 12 acres, and again about 30 acres in that crop. For both regions such criteria would permit classifying practically all the farms in the area. For less homogeneous regions, however, this would not be true. In southern New Hampshire, for example (the area embracing the southern parts of Hillsboro and Cheshire counties), separate groupings would have to be made for acres in orchard, number of cows, and number of hens. Many farms would fall into only one or two of these classification groups. Similar cases arise for other areas in New England.

To obtain the picture of the adjustments, *it is necessary that this classification procedure be done separately in every year.* Frequently, of course, the position of the modes will shift. Occasionally, however, even the primary criterion for classification will change; or more commonly, important new criteria will be added. By the early 'thirties, the potato farms group about 20-acre peaks and 50-acre peaks. An adjustment process has taken place which is typified in our modal farm over the intervening years. In some regions where orcharding prevailed in 1920, only small-scale dairying may be found now. In the Nashoba area, however, the specialized dairy farm as a type has been superseded by specialized fruit and by dairy-fruit combinations (though there is now some indication of a movement back to more dairying and even less fruit). *All these adjustments will be revealed in our modal types as the classification proceeds through the years.*

Perhaps some further remarks on the process of construction of type-farms should be made (still on the assumption of the availability of complete records for all farms). Sub-classification will give important indications of the amount of pasture land and crop

land associated with the 14-cow farms in Enosburg, and with the 28-cow farms there. Similarly pictures of the typical physical setups on the modal farms of the other regions are obtained. With respect to secondary enterprises, certain complications arise in areas in which considerable variations occur. Thus, some of the small dairy farms may have poultry; others may have potatoes, truck crops, or still other products. If these subsidiary ventures play an important rôle in the gross income situation, it may be desirable to segregate several type-farms, taking the most common secondary enterprises as bases of differentiation. In the potato-dairy region in central Maine, for example, it was desirable to investigate not only the "small" dairy-potato farm, but also the "small" dairy-potato-canning crop farm. In some of the Vermont farms having identical main enterprises, maple syrup was included; in others it was omitted. Rhode Island poultry farms in the same size group may hatch as well as raise chickens; differentiation in this respect gives a further type breakdown.

It is possible to conceive that, with our data and by this method of classification, a complete picture on the input side of each type-farm in every year also can be obtained. Thus, we would find the typical amount of labor used on farms with a 24-cow dairy enterprise in a particular region, on the 20-acre potato fields, in the 25-acre orchard, and so on. Separation into family and hired labor could also be made. We can determine fertilizer applications, reseeding procedures on the hay lands, use of car, truck, and tractor. Similarly, we can obtain the yields of corn, hay, potatoes, and of the various crops, as well as milk production per cow, eggs laid per hen, average weight of hogs. Prices received for the various commodities sold as well as the prices paid for both the non-durable and durable production goods purchased—all these are obtained through our procedure. Most important, of course, all these various items have significance for the particular farm organization under consideration.

In the brief outline just given, many problems with respect to details of classification have not been considered. Their solution on the level of the assumptions made would be rather academic. Much more helpful will be the discussion of similar problems and their solution in the actual situations discussed below. As a generalization it may be stated that the device of association tables has proved most useful in eliminating certain possible combinations of

enterprises the modal measurements of which were obtained from the classification procedure. Thus in the Maine area mentioned, field beans and potatoes were associated; similarly, canning peas and silage corn. Only the typical combinations were used on our modal farm. In this way, not only must the farm organizations with which we finally emerge satisfy the farm management man as a workable setup; they will suit our purposes only when those persons familiar with the area indicate that the farm actually is a characteristic type there. Moreover, as the type-farm changes over the period being studied, both these criteria must be satisfied in every year.

The Type-Farm Construction

In practice, of course, our data fell far short of what were assumed in the above presentation. We found no such detailed records. Without exception, the material available was for detached points in time; also it supplied only partial coverage of the area investigated.

Basic sources of information were the farm management surveys made during the years since 1919.[6] From the original records taken, at least the physical setup of several different-sized modal farms can be obtained—for the year in which the survey was made. If there are several important kinds of farming in the region—poultry and dairy, for example—separate surveys for each of these will generally be available. (The bulletin on the survey will also contain a discussion of the management practices that were prevalent. Knowledge of these is indispensable in the subsequent analysis.)

In many cases the region had been similarly surveyed at some other (let us say earlier) period. If dairy and poultry farming were also important in the area in that period, the classification process into modal size types for each type will provide a similar picture of the physical setup for that time. A task of interpolation then remains. However, in the cases when no such previous (or subsequent) survey was available, a modal setup for the "small" dairy farm, the "small" poultry farm, etc., was established in detail for some year rather remote from that already obtained. This was constructed in different ways in the various regions, depending upon what were the relevant sources of information available. Suppose, for example, that the data from a farm survey conducted in cen-

[6] There have been some one hundred of these in the six New England states.

tral Aroostook county in 1937 had given us modal setups for that year—a 20-acre potato farm, and a 50-acre potato farm. What were the typical farms in 1920 like? was the question asked of people in that area. Information was thus obtained from the potato specialist at the experiment station, from the members of the farm management staff, from producers who had lived there throughout the period. Using their varied information plus whatever record material they had available, it was possible to piece together the farm setups. As complete a picture as possible of operations and practices on these enterprises in that year was also obtained.[7]

By such various procedures, then, we were able to assemble pictures of what modal farms of various types looked like in at least two years, preferably some fifteen years apart in our period. We had data for real farm organizations; the figures were not some kind of mathematical averages for the agriculture in certain areas. Moreover, the individual practices used on the farm were known as well as the management program in general. We could then face the problem of connecting the cross-sections in these two separated years.

Again, the advices of those in the areas were of fundamental importance. How did potato acreage on our farms vary through the years? When did the dairy farms shift from butter production to fluid milk production? What was the course of poultry flock movement from this 300-hen flock in 1920 to this 800-hen flock in 1938? When were new acres set into orchards in the various fruit-growing areas? When did this particular type of farming move toward greater mechanization? Consensuses on such questions were sought.

Beside such materials were placed whatever data are actually assembled on an individual farm basis over periods of years. Farm

[7] These sentences suggest a greater amount of field work than was actually undertaken. The project was initiated with the hope of utilizing existing material primarily; hence as much information as possible was obtained through correspondence. A large number of persons centered in the six Land Grant colleges of New England thus cooperated in exchanges of information. Thanks in particular must be given to Professors C. H. Merchant, M. D. Jones, W. E. Schrumpff, and G. F. Dow in Maine; J. A. Hitchcock and T. M. Adams in Vermont; H. C. Woodworth and A. L. MacLeod in New Hampshire; R. E. Moser, G. W. Westcott, and A. H. Lindsey in Massachusetts; P. L. Putnam and D. O. Hammerberg in Connecticut; and J. L. Tennant in Rhode Island. Mr. C. D. Stevens and his assistants in the New England Crop Reporting Service were most cooperative. At the inception of the study Dr. Emil Rauchenstein of the Division of Farm Management and Costs spent some weeks in these various states; very helpful data and preliminary farm setups were thus obtained. Subsequently the writer spent a period of two weeks in various of the states filling empty spaces in our data. These two trips represent the total amount of field work.

account books, available in the areas for farms approximating our setup, gave figures for sequences of years. The returns of reporters sending records to the local office of the Crop Reporting Service provide similar material. Some of these reports go back the entire length of the period in which we are interested. Of course, data from these two sources do not supply the immediate answer to the problem of interpolating the structure for intervening years. There is the difficulty of establishing the "typicalness" of their movements. Very frequently there were found continuous series for several farms (more than five) which resembled closely, in 1937 say, the farm organization which had been developed from the survey records. Use of the averages of these in each year (or better, if enough are available, use of a distinguishable pattern of change) avoids many of the difficulties entailed in the data for an individual farm. Such are errors of reporting which cannot be counter-balanced; peculiarities of setup with respect to secondary enterprises; and changes in certain items, over a period as long as fifteen years, made necessary by the increasing age of particular operators.[8] These series, abetted by shorter sequences of information from pertinent reporters (or record books) which crop up now and then for a shorter period, do contribute to the emergence of a picture of the type-farms and their annual changes throughout the years. Amended by the reactions to them of individuals in each state and by the more general information obtained through the querying discussed in the preceding paragraph, our type-farms do add up to represent the farm organizations of the area and their trends through the period. Moreover, these summaries are in terms of manageable, recognizable farm organizations; in every year, each of our type-farms may be a real farm.

Having these setups and knowledge of management practices over the years, we have filled in part of the information in the actual case that our idealized presentation required. We still need figures on yields, on prices, and on such factors as the proportions of production sold (or salable) in particular years. How is such information, applicable to these farm types, to be obtained? In our assumed case we had such data for all our farms; in actual practice we can get such pertinent data only from the records already used in those

[8] If we define the "industry" as the type of farming (potato, tobacco, dairy-canning crop, etc.), then the entrepreneur of a representative firm changes his age only as the situation with respect to entry into the industry causes the typical age of entrepreneurs to change.

few periods in which surveys had been made. Indeed *no* data have been collected which really apply to particular kinds of farms in regions not defined by legal boundaries. The information taken from an individual farm record does not generally include data on these items. Even if it did, moreover, that particular farm's record on yields, on input factors, etc., might be quite different from those we would want to apply to a "type" concept. There do, of course, exist much data on a state basis—mostly for prices received by farmers. In New England, some series have been obtained on a county basis. Those for yields are available in the Crop and Livestock Reviews published jointly by the individual states and the Crop Reporting Service. Such price information by counties can also be obtained at least for products predominant in the regions. However, even the county figures frequently prove to be inadequate. Thus, data on potato yields for Aroostook county as a whole are averages for several producing regions having more or less consistently different levels of yield. Similarly, milk production per cow tends to be higher in a specialized milk-producing region within a county than is indicated by the figure for the county as a whole. One faces the alternatives of using the county or the state figures throughout, or of using their fluctuations at the level of the region (as indicated by the surveys in the years when available). Though it is recognized that neither procedure can give the correct figure in every year, in our work we have tended to use the latter alternative, especially where the series at the new level is strengthened by occasional independent observations from whatever actual material is obtainable. (In a study where further field work can be undertaken, investigation may well uncover information providing bases for closer approximations.)

With respect to each item appearing on the receipts or expenditures side of the farm account in every year, similar care was taken to use that series extending over the period (or to adapt that series) in such a way as to make the figure in question as applicable as possible to the region. Thus, for fertilizer one must investigate the typical application formula and price paid each year on a particular kind of farm in a given area. Rates of application and formula must be determined through examination of schedules in the survey years, through study of the farm management and extension bulletins issued, and, most important, through consultation or correspondence with the county agent, individual farmers, and other

qualified persons. The series finally adopted must satisfy these persons as being pertinent. With respect to prices paid for the fertilizer, most published data are on a national scale. Our purposes were served by series supplied by the cooperative or private dealer supplying the area, plus the pertinent transportation and volume differentials.

Many other illustrations could be given of the inadequacy for our purpose of series for large legally-defined areas. Thus, the changing value of the land in our type-farm over the period need not be closely related to the corresponding series for the state, which reflects changes in the amount of crop land assessed in the state as well as changes in assessed value per acre. This latter is generally the pertinent figure for an individual farm. An even better illustration is provided in the possibility of using state series for apple yields. Our individual farm setups trace the development of particular orchards, that is, trees of particular varieties and of specific ages, which were not distributed in each year as were the ages of all apple trees in Massachusetts, or New Hampshire, as the case may be. The solution demanded first the conversion of the state series to annual yield figures on the basis of mature-yielding tree units. Only then could we face the problem of what level of this new series ought to be applied to the specialized apple area under consideration, after it had also been converted to such standard units.

As already indicated, the task of tracing a type-farm through a period of twenty years involves the problem of converting one farm setup into another farm setup. Thus, the orchard becomes a dairy-fruit farm and finally a dairy farm; at the beginning of the period, no dairy enterprise could be called typical, while at its end, no orchard could be so classified. More generally, combination farm types shift the relative importance of their enterprises. The tobacco-dairy farm becomes a dairy-tobacco venture. Allied is the problem of significant shifts in production or marketing techniques. Instead of sowing seeds, the onion farmer now tends to plant onion sets. There have been shifts to alfalfa, with the corresponding adjustments in fertilizing practices and in methods of dairy feeding; or pasture improvement programs were undertaken. Where a dairy farm sold butter, it now markets fluid milk. Horse power supplied by animals was typical in potato lands of the 1920's; today a tractor is typical.

To facilitate the handling of this range of problems, a division

into two categories can be made. The adjustments first indicated (shifts to new types) do indeed typically occur gradually on an individual farm. Our (conceptual) classification procedure handles such adjustments readily; and the modal farm does reveal the shifts over the years. Gradually the orchard is used for hay or pasture, no new plantings are made, more cows are purchased or raised. It is likely too that in many areas the shift from butter to milk occurs gradually on the individual farm; over a number of years the amount of butter sold declines while the returns from fluid milk increase. However, it is more likely that such an adjustment take place during one budgetary period on any one farm. Nonetheless, the transition period will probably not be the same for all the dairy farms involved. For the area taken as a whole, therefore, the shift may again occur gradually, over four or five years, perhaps. Over such a period our type-farm may be most representative if it portrays a complete operational unit with less butter and correspondingly more milk in successive budgets. The problem is thus handled in a manner exactly paralleling the treatment in the case of gradual adjustment discussed above.

With respect to such an adjustment as that in the source and form of farm power, on the other hand, its most obvious manifestation, that is, acquisition of a tractor must be accomplished at one time (on a small farm, at any rate). Again, individual farms make the shift at different times; even today there are some specialized potato farm organizations which do not include tractors. Wherever such adjustments are being considered which must be made between successive budgetary periods on an individual farm but which are so made over a period by the individual farms in a region, the type-farm, if it is in each year to be a workable unit, must also make the adjustment—addition of a tractor, let us say—between successive budgetary periods. If this adjustment period is quite short, (that is, most farms make the shift over one year), our conceptual scheme can again be readily paralleled; the change is revealed in two successive setups of the type-farm. Where, however, this period is relatively long (three or more years, for example) and where the transition to tractive power seems to have taken place rather evenly through those years, it seemed advantageous to depart in some measure from our concept of an operational unit. Instead of acquiring the tractor at one time—as it is of course acquired—it was instead "fed into" the type-farm in segments, one-fourth in the 1926

budget, another fourth in 1927, etc. (These "segments" need not of course be equal, if the actual circumstances attending the adjustment gave particular emphasis to the shift in particular years.) Not only does such a procedure involve piecemeal application of items on the expenditure side (depreciation and operating costs and perhaps labor and horse expenses) but also on the receipts side, if introduction of the tractor was accompanied in the area by increased cash crop acreages, and/or diminished areas in hay and other feed crops.

Further illustration need not be given of the various processes adopted for approximating each item and its components on the receipts and expenditure side of the annual budgets. These procedures varied from item to item, and of course from farm-type to farm-type, depending upon the material that could be assembled. As guides for interpolation, no use was made of the series available on a national scale. And only as a last resort were the annual fluctuations of series on a state basis held to be pertinent for small areas in the rather diversified agricultural pattern of New England. Though care was taken in the estimation of each item—whether it be the quantity and price of alfalfa purchased on a dairy farm, or the capacity and cost of the incubator purchased on a poultry farm —it would be too ambitious to expect that our estimate corresponds precisely to the figure that would be obtained in the "complete data" situation discussed in the opening pages of this article. For major items of receipts and expenditures, however, our estimates must be very close to the "actual." For less important items (about which personal opinion in the area is less unanimous and recorded material is very sparse) whatever lack of precision exists cannot introduce large errors. Greater precision can certainly be attained in the current material which will keep our series up to date. Moreover, as the spread of this type of work opens up new sources of data, refinements will undoubtedly be made in the work already done.

The Net Income Computation

The resulting sequence of changing cash income and expenditure on each of our type-farms permits the computation of the changing picture of net farm income. Precisely what this net figure measures depends of course upon what we include in the receipt and expenditure categories of our budgets. Various measures of the farmer's

"prosperity" may therefore be derived. However, the peculiarities of farming and its development in different areas may cause identical computational schemes to yield net figures which are not directly comparable. Thus, such accounts for a very specialized farm, on the one hand, and a diversified farm, on the other, will give two net figures one of which must provide for a larger amount of food for the farm family. (It is generally impossible to segregate from among the various input factors those contributing to the produce consumed by the farm family; in general, a diversified farm will provide a larger proportion of such consumption.) In most cases, housing is part of returns in agriculture and the net income figure is additional to such housing. Yet in the onion area of the Connecticut Valley in Massachusetts, the farm accounts are completely independent of charges for housing: the farmer and his family "go" to their onion acreages just as factory employees "go" to work.

To dispose of these incomparabilities, one might define rigorously the amount of housing and the amount of domestically-produced food that is to be included in all the farm types. However advantageous such a procedure appears to be, in practice it would encounter very serious difficulties. Rather arbitrary allocations of labor input, explicit evaluation of opportunity costs, and insupportable decisions with respect to farm and purchase price differentials would have to be made. In our work, therefore, no such standardization was attempted (with the two exceptions noted in the ensuing paragraphs). When comparing net income between two types of farming, therefore, one must bear in mind that there may be differences in the housing and in the food provided by each of the farms. By and large (omitting the onion case) the former difference is a negligible one; in New England the latter is also small.

In view of the difficulty of "typifying" the debt structure on various types and sizes of New England farms, it was assumed throughout that payments neither of principal nor interest were made on long-term debts (such as mortgages, and purchase loans). The net income figure is thus characterized as money available for paying interest, as well as for paying other things. This procedure introduces readily a standardization which involves no ambiguity. Moreover, there are distinct advantages in having net figures which give some indication of debt-paying potentialities.

Finally, no attempt was made to evaluate the contribution of family labor. The "labor income" concept was thus discarded in

favor of a "family cash income": the net income residual is available not only for family living, and for interest payments, but also for the wages of family labor. It was assumed that every farmer had some such labor available. Indeed, in considering actual records, no outlays were included for as many as 17 months of man labor on a "small" farm (unless labor requirements were so concentrated that hired labor must be considered, as at haying, apple-picking, potato harvesting, and similar peak periods). On larger farms such departures from this rule were permitted as coincided with usual practice in the area. Thus, even though a 25-cow farm in Rhode Island could be handled by two full-time men, no allowance for family labor was made if the typical 25-cow farm in the region did indeed hire a full-time hand. (In truth, of course, such a farm did at times require the services of a third man; no additional charge was then made for the chores of the farmer's son, and for his time with the poultry flock.) Hence, the "two-man farms" to which our computations refer actually have additional family labor which is not charged to expenditures. Our "family farm" includes a bill for hired labor only when its demand for labor exceeds what a typical farm family would have available at the pertinent time.

Index Number Construction

Given these annual budgets, various indexes may now be constructed. Our interests have centered upon indexes of prices farmers receive and prices farmers pay; indexes of quantity sold and of scale of operation; indexes (relatives) of receipts and of expenditures; and finally, indexes (relatives) of our family cash income. Moreover, we desired such an index number construction that a price series multiplied by the corresponding quantity series would give the series for receipts or expenditures, as the case may be.[9] Thus,

[9] The reader may well ask why, if these indexes were our interest, did we go through the trouble of constructing these budgets. Why not get suitable weights, price series, etc., and build up the indexes directly? While such a direct approach is possible, its proper achievement would still require practically all, if not all, the data put into our budgets. For in order to get formulations for P and Q such that $V = P \times Q$, systems of changing weights would be necessary, that is, all the variations of quantities and prices over the years. Moreover, it is impossible to go from such price, quantity, and value indexes to indexes of net income. In order to get this last series, a *money* gross income and *money* expenditure would have to be introduced in at least one year. Hence, such bulk items as repairs, depreciation, insurance, and remuneration for outside work would have to be determined at least in that year. All in all, these considerations prompted making a complete budgetary approach the immediate goal. *Moreover, there is distinct value in having an operational farm setup in mind when estimating the pertinent price and quantity weights.* Computations

the variations in expenditures and in receipts can be examined year by year in variations of the price structure confronting the farmer and in variations of his output or scale of operation. The familiar formula satisfying this factor-reversal test is Fisher's "ideal." One can advance reasons against the use of this formula for index numbers applicable to regions in which prices of the product and the output are not bound together in a close functional relationship. Moreover, in this study we can always compute directly and exactly from our budgets the correct indexes of receipts and expenditures. After selecting a base period, we can by simple division obtain for each year relatives of receipts and expenditures which will show precisely the effects of all the changes and adaptations made on our farms. Instead of using the Fisher formula, therefore, a price index was computed using the Paasche formula with weights which are averages of the quantities over a period of years. (In most cases these quantities had undergone a marked change in level during the years from 1920 so that a shift in the weight base was deemed desirable. As a rule, separate weights were used for the period of the 'twenties and for the 'thirties, with transitional years in which were employed certain averages of the indexes computed with these two sets of weights. Precisely what years constituted the dividing line for the weighting periods depended upon situations peculiar to each of the farm types.[10])

The quantity indexes were then computed simply by dividing each price index into the corresponding relative of receipts or expenditures. The product of P and Q must therefore be V, the value index. This is a logical and simple method of dealing with the problem and one which places primary emphasis upon our price index and the weights selected for it. In our computations, too, all bulk items were handled so that they were divided among P and Q in the same way as other prices and quantities enter into the rest of V.

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for a regimen of commodities closely tied together in this way may provide some solution to the problems of index numbers. (For a discussion of these problems in an associated field see Hans Staehle, A development of the economic theory of price index numbers, Rev. Econ. Studies, June 1935, pp. 163–188. Also, Ragnar Frisch, Annual survey of general economic theory: The problem of index numbers, Econometrica, January, 1936, pp. 1–38.

[10] Thus the shift from butter to milk in the Cabot-Marshfield area in Vermont prompted use of the year 1930 for introducing a new set of weights. With the Rhode Island poultry farm, 1929 was used. In that year the size of flock began to fluctuate about a new, higher level.

As the indexes are extended currently, adjustments in each region will no doubt involve further shifts in weights.

Thus changes in V are indeed reflected completely in the changes in P and Q.

Illustrative Results

These various procedures have been applied to 32 type-farms built up from information available in New England. Series of indexes were obtained for the years 1920–39 (with comparable figures for the years 1910–14). Characterized by main enterprises as found in recent years, and roughly localized by county and area, these types are:

MAINE: specialized potato, Aroostook county; (family and 2-man)
dairy-canning crop, central Maine, embracing parts of Somerset, Piscataquis, and Penobscot counties; (family and 2-man)
dairy-potato, central Maine; (family and 2-man)

VERMONT: dairy, Orange and Windsor counties, Randolph-Royalton area; (family)
dairy-maple products, Washington county Cabot-Marshfield area; (family)
dairy-maple products, Franklin county, Enosburg area; (family and 2-man)
dairy, Chittenden and Addison counties, Vergennes area; (2-man)

NEW HAMPSHIRE: dairy-potato-lumber, Coos county, Colebrook area; (2-man)
fruit, Hillsboro county, southern part; (2-man)
poultry, Cheshire county, Swanzey area; (family and 2-man)

MASSACHUSETTS: dairy, Worcester county, Hardwick, Templeton area; (family and 2-man)
dairy-fruit, Middlesex county, Nashoba region; (2-man)
fruit, Middlesex county, Nashoba region; (2-man)
onion, Hampshire county, Hadley area; (family)
tobacco-dairy-vegetable, Hampden county, Connecticut Valley; (family and 3–4 man)

CONNECTICUT: dairy, New London county, Lebanon area; (family and 2-man)
retail dairy, Windham county, Putnam area; (family)
tobacco-dairy, Hartford county, Havana seed area; (2-3 man)
tobacco, Hartford county, Broadleaf area; (2-man, 3-man)

RHODE ISLAND: dairy, Providence county; (family and 2-man)
poultry, Providence county; (family and 2-man)

These comprise a sufficient number to yield a cross-section of New England commercial agriculture today; over time they also provide a valuable moving picture of the adjustments which have taken place in the agriculture of these states since the first World War.

Seven index series (prices received and paid, quantities on the income and input sides, gross cash receipts and expenditures, family cash income) are now available for each of these types. It is most interesting to compare the variations among types which are generally grouped together in larger categories. Thus, were one to superimpose charts of corresponding indexes for three two-man type-farms in Maine (all three of which have important potato enterprises) they would reveal not only markedly different intensities of fluctuation, but significantly different trends over the twenty-year period. Particularly one would note the movements of the quantity indexes. The farm organization which has been preponderantly dairy (in the Newport-Dexter area) has fluctuated little in size, as measured by this input index; since 1934, however, there has been a sharp upward movement. The types on which potatoes formed the major enterprise, on the other hand, have moved up steadily through most of the period; now there are indications that a decline is in process. Similarly, comparison could be made between specialized fruit farms of approximately the same size and in nearby regions, southern New Hampshire and the Nashoba area in eastern Massachusetts. Again significant differences are found in the figures. In truth, these "similar" areas have experienced histories of tree-plantings which were not parallel. Subsidiary enterprises (in the period prior to peak apple production—and subsequent to it if the orchard is not sustained) have been quite different in the two regions. And even the preponderance of different varie-

ties in the area had very distinct effects upon the fruit growers fortunes. On all these accounts, the two types require individualized treatment; expectations for the two are different.

Even more interesting is a segregation of two farm types found side by side in the tobacco area of Massachusetts bordering the Connecticut River. Most significant bases for separation is not their size (one required the labor of between 3 and 4 men per year throughout the period; the other between 1 and 2 men); rather it is the fact that one type, the smaller, is operated by Polish farmers. The other type is non-Polish. In that area, the distinction is of fundamental importance. Neither farm is specialized. Today there are dairy enterprises on both; the Polish farm has onion acreage even exceeding that in tobacco, while the other has a relatively small potato area. Both reveal the same general movement of tobacco acreage over the years. There is a sharp decline in the middle 'twenties which was taken up recently—but then only in part. Compensating adjustments take place in other enterprises. Yet careful study points to significant differences in these adaptations. In general, more efficient use of labor and other resources seems to have been made on the Polish farm. There one finds what might be called greater "expansibility" in the accomplishments of a given labor force. Resumption of tobacco acreage after 1934 was accompanied by a relinquishing of the secondary ventures not nearly so marked as that which occurred on the non-Polish farms.

In figure 1a, our series of family cash income for the two types are plotted as relatives (1924–1936 = 100). By and large, these move up and down together. The pattern is dominated by the common product, tobacco, though there is much more intensified variation on the larger farm. From 1934, however, this parallelism tends to disappear—secondary enterprises of different kinds are influencing the situation. Succeeding parts of figure 1 (b, c, d,) show the course of incomes and expenditures, and of the several indexes of prices and quantities. There is of course smaller year-to-year variation on the cost side of the picture. Particularly interesting is the parallel movement of prices paid on the two farms (figure 1c). Trend lines fitted to the two quantity indexes for each type-farm tend to be parallel (figure 1d) though the yield fluctuations assure that the residuals on the receipts side have a larger standard deviation. Examination of the corresponding trend lines for the two farms, however, reveals the influence, among other factors, of the previ-

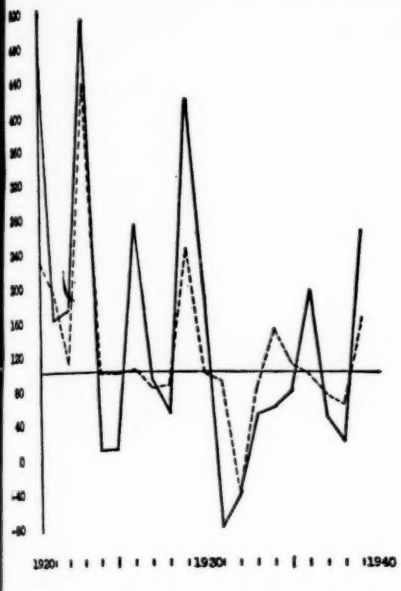

FIG. 1a. FAMILY CASH INCOME INDEX

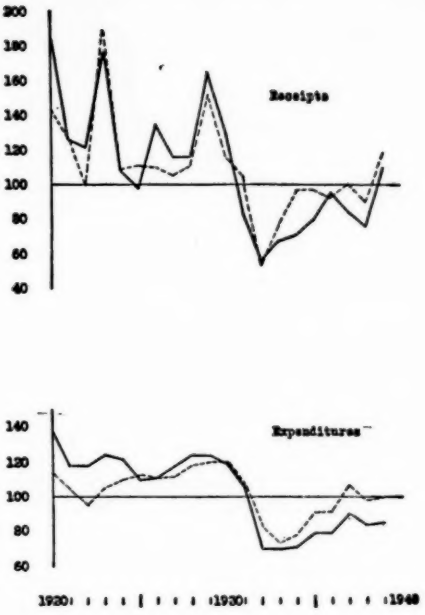

FIG. 1b. VALUE INDEXES

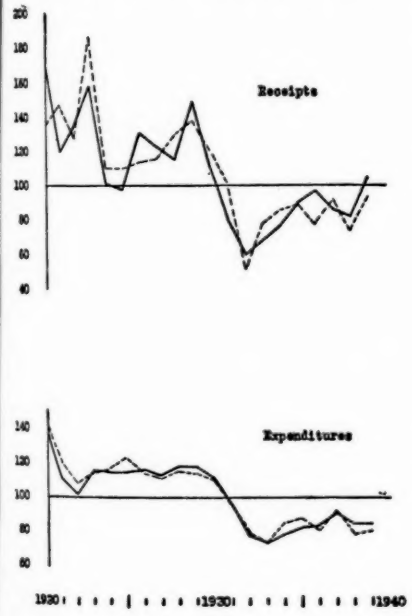

FIG. 1c. PRICE INDEXES

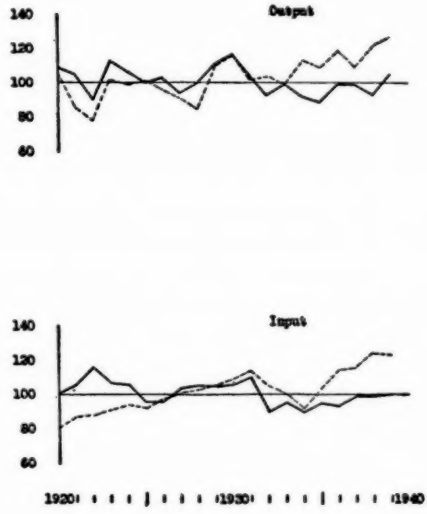

FIG. 1d. QUANTITY INDEXES

FIG. 1. INDEXES FOR MASSACHUSETTS TOBACCO FARMS. (1924–36=100)

—— Non-Polish
– – – Polish

ously-mentioned activity of the Polish family. Their quantity index moves upward; for the non-Polish farm it declines. Indeed, there is ample evidence of a growing and vigorous farming in the one type, and of a stationary, perhaps stagnant, agricultural organization in the other. Such different situations must be segregated if we are properly to discuss, analyze and deal with tobacco farming in Massachusetts.

An important need which our indexes can fulfill is that of supplying a meaningful and usable way of measuring the parity income concept underlying our agricultural adjustment legislation. Except for the nation as a whole, there do not yet exist annual net income figures for agriculture—even for such heterogeneous units as states. At best, parity payments can be allocated only on the basis of price relationships, despite the carefully worded alterations in concept in the acts invoked since 1936. Furthermore, such prices had to be deflated by indexes of prices paid by farmers which were not really applicable to all farms. Our series permit computation of the pertinent ratios of prices received to prices paid; they also provide the agricultural information necessary for computing the parity income applicable to particular farm units.

Distinctions which ought to be made to allow for the varying situations on different types can now be examined and utilized. Consider, for example, the following series for three dairy farms in New England. All are included in the fluid-milksheds of large cities. Again, they are of comparable (family) size, but the degree of specialization and the nature of subsidiary enterprises vary. The Rhode Island farm has a small poultry enterprise; with the exception of some off-the-farm income and small proceeds from the sale of lumber, however, it is primarily a specialized dairy enterprise. In Vermont, maple sugar and hogs have in some years provided important sources of revenue additional to that from dairying. Canning crops (principally peas, beans, and corn) are important on the Maine enterprise. Predominantly, however, they are milk producers, and the prices received for this product are highly correlated in all three situations. Yet their price indexes, deflated by the corresponding prices-received series, give significantly different parity ratios in most years (figure 2a). All have been converted to a 1910–14 base (prices received, 1910–14, divided by prices paid, 1910–14, equals 100). Even more interesting are the relative figures, again on the 1910–14 base, for the family cash income shown in

figure 2b. Such data are relevant to parity income computations; significant differences, both as to level and variation, are found on these three familiar types of New England dairy farms.

Such valuable usage of our indexes rests upon the fundamental characteristic of their construction—a structure which segregates agricultural developments within the legally-defined unit (the

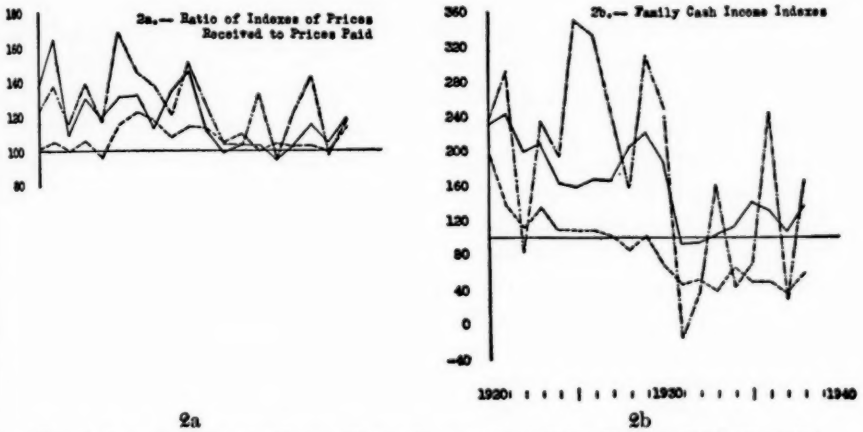

FIG. 2. COMPARISONS FOR THREE DAIRY-COMBINATION TYPE-FARMS. (1924–36=100)

——— in Rhode Island
– – – in Vermont
–·–·– in Maine

county, the state) used as the basis for collecting data. Thus they reveal the important variations concealed by these broad classifications. Heretofore, study of this kind of variations was possible only through the use of individual farms selected in one way or another. Quite apart from difficulties (and dangers) of such selection, it is impossible to study all the farms, and virtually impossible to put together those individual cases which would permit an overall picture embodying all the significant developments. The type-farms, with their modal characteristics changing through the years, do permit such examination.

They can well serve as the working unit in agriculture. Since we cannot deal individually with all farms, it is in terms of just such a type-farm that we must think when contemplating the agricultural problems of an area. For they permit economic analysis of the agricultural economy in terms of adjustments and shifts within

the unit with which the farm management worker is familiar. Moreover, our types supply means through which activity in the area may be implemented; they are handles, so to speak, by which we can reach down into the region. Planning committees, on whatever level, must think of their plans as they affect precisely such units. More, the plan for an area is itself developed on the basis of them. Such considerations promise an important role to the type-farm in these days of action agencies and action programs.

In addition, however, it is likely that this kind of investigation can fulfill other important functions. The refinements of our budgetary work may permit detailed investigation and analysis of relationships between various factors as they occur on a typical farm setup, and of the pattern of movements displayed by different kinds of farms in the same area, or by the "same" kind of farm in different areas. Such problems as the relationships between indexes of scale of operation on different modal types may be examined. How do these relate to the income indexes of some earlier period, to the price indexes? While the great number of series made available by our study has not yet been subjected to such analysis, it does indeed seem likely that such homogeneous material will open a broad realm to intensive investigation.

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SOURCES AND DISTRIBUTION OF THE FARM POPULATION IN RELATION TO FARM BENEFIT PAYMENTS

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Factors Influencing Farm Family Welfare

ALL STUDENTS of rural society are concerned with the welfare of the people who live on the land. Those whose primary interest is the rural people know that the factors contributing to the well-being of the farm population are very complex. Even a little study indicates that success and happiness in farming depend upon a multitude of influences. In one case some of these are of primary importance; in another it is a different combination of elements that contributes to satisfactory living on the farm. As a means of assisting us to understand the underlying features of farm living, it may be useful to classify all of these factors into two large categories: (1) all the things that the farm family itself can do to improve its situation and prospects; and (2) all those forces which impinge upon the farm family from the outside. The second category consists largely of state and national policies for agriculture.

Even though we dismiss it with a word, the first of these categories is of tremendous importance. The farm family, by better utilizing its own resources, by planning carefully, by exercising diligence, by exerting energy, and by practicing thrift, can do much to elevate its own condition. In the midst of the most unfavorable and depressing circumstances, there are always some families which manage to do rather well on the farm. The elements in their success and well-being should be carefully studied in order that their pattern of living may be followed by others. But this paper is concerned with the second category, those external factors which affect the well-being of our farm families.

How important in the welfare of the farm family are state and national agricultural policies? Probably no one can give an exact answer to this question. But that these policies are of tremendous importance no one can successfully question. Likewise, all will probably agree that these factors are much more important at the present time than they were a century, two decades, or even a decade ago. Whatever else they may have done, the alphabetical agencies certainly have made all conscious of the fact that the

welfare of the farmer is largely dependent upon what is done to him by state and national programs. If we were to express our own private opinion, we would estimate that the American farmer in 1941 is fully as dependent for his well-being upon what is done to him by state and national agricultural policies as he is upon the efforts of himself and the members of his family. Some may think our estimate too high; others may be of the opinion that it is too low; but the major fact of the farmer's dependence upon national and state policy cannot be denied. Therefore, the formation of these policies should call forth the best efforts from all those concerned with the welfare of the farm population.

Few would contend that we have in his country anything approaching a rational and equitable national policy for agriculture. To a considerable extent our farm program can be characterized as the net result of pressures by vested interests and special privileges to favored crops and areas. This may sound somewhat harsh and immature, but we believe that some analysis of the way our program has contributed to several classes of farmers, to one type of farming and another, to the various regions and states will make the results of national efforts to relieve farm distress even more appalling than they at first appear.

Demographic Factors

As rural sociologists, very naturally we think that the farm population should be the center of interest in any farm program. It is our contention that a few basic population facts must constitute the very foundation of any equitable state or national policy for agriculture. Indeed, some of these population facts are so elemental that they must form the warp and woof of all intelligent state and national planning. Let us examine briefly a few of the most significant of these.

Ever since John Graunt, "Citizen of London," wrote his small tract, Observations upon the Bills of Mortality, in 1662, it has been known that the country is the producer of population and that the city is the consumer. Studies since that time have merely verified and elaborated his basic findings. In fact among city dwellers the reproductive springs have become so dry that the discovery of a city with enough births to offset its deaths would be one of the seven wonders of the world. Nevertheless, cities grow. On the other hand, children are one of the chief crops of the farmer, and the

farther he lives away from the city and its influences, as a general rule, the more children he will have. But the farm population does not increase. A measure of the rapid growth of cities at the expense of the rural areas is gained from the census data which show that during the thirty-year period from 1910 to 1940, the urban population increased 77 per cent while the rural population of the nation increased by only 15 per cent. If comparable data were available they probably would show a decline in numbers of the population actually living on farms. This was the trend during the last twenty years as evidenced by a decrease of the rural-farm population from 31,358,640 in 1920 to 30,151,076 in 1940. Furthermore, despite the absence from the country of doctors, nurses, hospitals, and modern plumbing, the farmer's expectation of life is considerably higher than that of the city man. In other words, rural people have more children and live longer than do the city people. Therefore, were it not for rural-urban migration, the rural population would increase much more rapidly than the urban.

The association between the agricultural occupation and population increase is made clear by some recent computations of the National Resources Committee.[1] In 1930, the latest data, the fertility of the native white population was 112 per cent of that necessary to meet replacement needs incurred by the prevailing death rates. Among Negroes the corresponding percentage was 113. In other words, for the nation as a whole the fertility of the population was about 12 per cent above that necessary to maintain a constant number of people. However, in the large cities, those with a population of 100,000 and over, the fertility of the native white population was only 76 per cent of that necessary to maintain the numbers; and among Negroes it was only 68 per cent. But as the urban characteristics became less intense the fertility of the population increased, so that for all urban areas the percentage stood at 86 for native whites and 72 for Negroes. Compare these deficits with the situation in the rural areas where the corresponding percentages were 154 for native whites and 161 for Negroes. Highest of all stood the rural-farm population where the fertility among native whites was 169 per cent of that necessary to maintain numbers constant, and among Negroes it was 180 per cent. And if we were to consider some of the most remote rural areas, we would find rates of increase

[1] See National Resources Committee, The problems of a changing population, Washington: Government Printing Office, 1938, pp. 127–136.

even four times above replacement needs. These data leave no room for doubt that the rural-farm population is the seed bed of the nation. Much of the farm problem hinges about this fundamental fact, and from it also comes the justification for long-range national and state efforts to improve rural life through a more equitable support of our educational institutions, health facilities, communication systems, and other public services.

Other fundamental, and for our purposes pertinent, population characteristics are to be found in the nature of the age and sex composition of the farm population. In general the significant features here may be described as follows: the rural population, especially the farm population, contains a very high proportion of children in the dependent ages, a very low proportion of men and women in the working ages, and a high proportion of persons in the advanced ages or in the dependent years. On the other hand, the city is characterized by having a very low percentage of children, a low percentage of the aged, and a very high percentage of persons in the working or economically productive age group. In other words, the ratio of dependents to contributors is very high in the country as compared to the city. Consider some of the data. When the two residential population groups are compared on the basis of their respective proportions of the total population, the rural-farm population has 138 children under ten years of age for every 100 in the urban population. Likewise, for every 100 oldsters above 65 in the urban population, the rural-farm has 101. The old persons are concentrated in the rural villages. For every 100 urban persons in the working ages, between 20 and 45, the farm population numbers only 74. If persons under 15 and those 65 and over are counted as dependents, and those between 15 and 65 are counted as producers, then the 1930 urban population of the United States contained only 448 dependents for every 1,000 producers, while the farm population included over 700 dependents for every 1,000 producers.

Rural-urban migration is the third feature of population analysis which must be considered. It is this factor that keeps the city population from declining, prevents the farm population from mounting at a dizzy pace, and accounts for the concentration of children and aged persons in the country and of persons in the working ages in the city. During the period 1922 to 1929 more than two million persons annually left their homes on the land for the cities. During the same period millions of persons also left the city for the land.

However, the outward flow failed to equal the inward tide, and the net gain for the cities of the nation equaled about 700,000 persons per year. With the coming of the economic crisis there was a sharp rise in the movement of persons from the city to the country and at the same time there was a rapid decline in the migration to the cities. In the two years of 1931 and 1932 there was actually a slight gain in the farm population, mainly due to the shutting off of migration to the cities; this resulted in the damming up of rural youth in the rural areas. In 1933 the net migration balance was again in favor of the cities, and it has continued so to the present. For the entire period 1920 to 1930, the net movement of persons from the country to the city amounted to about six and one-half million persons. Obviously the relative economic and social position of the farmer would be greatly improved if his contribution in the production of the future population both that which remains on the farm and that which migrates to the city, were appreciated, and if appropriate state and national policies were devised to assist in taking a part of the economic burden from his shoulders.[2]

These basic population factors have tremendous importance and their significance should be fully taken into account in the formulation of state and national agricultural policies. Obviously their implications are much greater than for such measures as soil conservation and parity price payments. Generally speaking, the farm population is rearing and educating two persons for every one it retains to carry on the work of agriculture. The other one is contributed at about the age of twenty to the cities of the nation. This represents a tremendous transfer of wealth from the country to the city, an annual subsidy of millions of dollars. Furthermore, such a continuous drain is having cumulative effects, and it is becoming increasingly more difficult and impossible for the farming sections to maintain the quality of education, and other institutional opportunities, that modern civilization demands. Only by reason of state aid has it been possible for the rural communities to carry on as well as they have. But state assistance is not enough. Migration does not stop at state lines. A rural state such as Mississippi, which annually contributes a high percentage of migrants, could spend its entire state income on education and still have a lower expenditure per student in attendance than is now being spent in some of the

[2] For a more detailed treatment of rural demography, see T. Lynn Smith, The sociology of rural life, New York: Harper & Brothers, 1940, pp. 39–197.

more favored states to which its youth go. In general the states with the lowest per pupil expenditures, and usually the poorest schools, are spending the highest proportions of their incomes on education.[3] These are of course the primarily agricultural states, including practically all of those in the western and southern regions. The highly urbanized and industrialized sections should help pay at least a small share of the cost of maintaining adequate educational facilities in the rural districts, because it is to them that the migrants from farms resort. It is they who benefit by having a well-educated citizenry and who are penalized if the rural educational facilities are poor. This assistance should be substantial enough to effect a considerable reduction in the farmer's tax burden. The principle of equalization that has worked so well within the states must be applied nationally among the states. The embodiment of this feature in national agricultural planning would do much to place the farmers on an even standing with the other great occupational groups. Only through some such provision can the welfare of the nation as a whole be insured.

How Farmers Share in Benefit Payments

After this preliminary analysis, let us consider the way in which our present agricultural program is actually operating. In this connection we wish to call attention to what we feel is a basic proposition: all national and state agricultural policies should have as their ultimate goal the welfare of the farm and the national population.[4] In other word, our attempts through federal and state agencies should be intended to improve the well-being of the people on the land, and through them that of the people in the secondary occupations and industries. As a nation we are interested in improved farm practices, soil conservation, better livestock, schools, churches, roads, telephones, radios, electricity, and the many other goods and services, not as an end in themselves but as means to a better standard of living and a more satisfactory life for the people. This is an elementary and self-evident proposition. The only reason that it is necessary to call attention to it is because we have departed so far from it.

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[3] Cf. Report of the Advisory Committee on Education, House Document 529, 75th Congress, 3rd Session, Washington, 1938, pp. 14–20; and Smith, *op. cit.*, pp. 367–396.

[4] Some economists who have been accustomed to thinking in terms of production control may take issue with this assumption.

In recent years governmental payments have loomed large in agricultural incomes. Payments for practicing approved soil conservation measures, the so-called parity price payments, and special benefits such as payments under the Sugar Act make up the bulk of these governmental aids. These benefit payments are distributed to the states and to the farmers in the states by rather complicated formulae. What we are ultimately interested in of course is that the money eventually gets to the farm population. The only justification for agricultural payments at all is to help raise the incomes and therefore increase the well-being of the farm people. Simplest of all formulae for distributing the funds would be to give each farm person his per capita share of the total benefits. If any departures from this rule were made it would seem that need should be the additional factor to be taken into account—for example, those states, areas, and farm families who were in greatest need of assistance might well be given correspondingly more benefits than those whose need was less. Only in this way can the pressures of special interests, favoritism of officials, inflated values of land and buildings, location near spots that have already been favored by such factors as tariffs and governmental and private expenditures, keep from having their influence upon the manner in which the benefits are distributed. In Biblical terms, this amounts to giving to them that hath and taking away from them that hath not. But what are the facts in the situation?

According to the official reports published in Crops and Markets, the incomes of farmers in the United States during the four years 1936 to 1939, inclusive, were increased a total of $1,943,637,000 by means of government payments.[5] That is, the government distributed to the farmers of the nation nearly two billion dollars through the media of the soil conservation program, the parity price payments, and sugar benefits. In 1935 the farm population of the nation was taken in a census and was reported as 31,800,907.[6] In other words, during this four-year period the government distributed funds to farmers amounting to approximately $61 per farm person.[7]

[5] Crops and Markets, 17: January, 1940, Bur. Agr. Econ., U.S.D.A., Washington, pp. 1–3.

[6] United States Census of Agriculture: 1935, Washington: Government Printing Office, 1937, III, p. 150.

[7] During this same period, 1936–1939, inclusively, the cash receipts from the sale of the five basic crops amounted to $344 per capita of the farm population. The five basic crops are those upon which benefits and parity payments are made, and consist of cotton, tobacco, wheat, sugar, and corn-hog.

How was the money actually apportioned among the farm people of the nation? By this we refer not to the complicated formulae used in determining how the funds were to be distributed, but what did the farmers of various types and in the different regions receive?

TABLE 1. RECEIPTS PER FARM CAPITA FROM AGRICULTURAL ADJUSTMENT BENEFIT PAYMENTS, ALL EXPENDITURES OF THE U. S. DEPARTMENT OF AGRICULTURE AND LOANS, DURING PERIODS INDICATED, BY STATES*

State	Per capita receipts from agricultural adjustment payments benefit (1936–1939)	Rank	Per capita receipts from all U.S.D.A. expenditures (1936–1939)	Rank	Per capita receipts of all U.S.D.A. loans (1933–1939)	Rank
United States.....	$ 61		$108		$174	
North Dakota.....	197	1	341	2	409	7
South Dakota.....	182	2	317	3	396	9
Montana.....	178	3	350	1	564	2
Iowa.....	154	4	209	9	450	5
Kansas.....	142	5	275	4	277	15
Nebraska.....	135	6	235	6	406	8
Wyoming.....	119	7	243	5	526	3
Texas.....	104	8	167	12	221	19
Colorado.....	102	9	198	10	286	14
Idaho.....	95	10	187	11	434	6
Arizona.....	95	10	210	8	333	12
Illinois.....	88	11	139	15	338	11
Oklahoma.....	76	12	151	14	117	30
Minnesota.....	74	13	113	20	273	16
New Mexico.....	67	14	164	13	228	18
California.....	67	14	114	19	493	4
Louisiana.....	60	15	101	21	112	33
Washington.....	59	16	131	18	229	17
Oregon.....	59	16	137	16	384	10
Indiana.....	57	17	97	22	157	23
Mississippi.....	57	17	92	25	132	26
Missouri.....	55	18	94	24	98	39
Arkansas.....	55	18	101	21	130	27
Utah.....	50	19	114	19	322	13
Wisconsin.....	49	20	76	31	195	20
Alabama.....	46	21	81	27	114	32
Georgia.....	45	22	78	30	125	28
South Carolina.....	45	22	86	26	115	31
Delaware.....	41	23	79	29	58	42
Ohio.....	40	24	80	28	110	34

* Adapted from statistics extracted from Crops and Markets, January 1940; the Agricultural Census of 1935; and official reports from the Office of Government Reports, Statistical Section, October 1940.

TABLE 1 (Continued)

State	Per capita receipts from agricultural adjustment benefit payments (1936–1939)	Rank	Per capita receipts from all U.S.D.A. expenditures (1936–1939)	Rank	Per capita receipts of all U.S.D.A. loans (1933–1939)	Rank
Nevada	39	25	224	7	1,140	1
Michigan	35	26	55	35	118	29
North Carolina	33	27	63	34	70	41
Tennessee	31	28	53	36	84	40
Kentucky	29	29	52	37	54	43
Florida	27	30	64	33	142	24
Maryland	27	30	136	17	102	37
Maine	23	31	39	40	134	25
New Jersey	21	32	75	32	166	21
Vermont	17	33	34	43	103	36
Connecticut	15	34	47	38	109	35
Virginia	15	34	31	44	44	45
Pennsylvania	14	35	28	45	48	44
New York	14	35	38	41	101	38
Massachusetts	11	36	41	39	163	22
New Hampshire	11	36	37	42	58	42
West Virginia	8	37	23	46	30	46
Rhode Island	5	38	95	23	228	18

The answer to this question is found in table 1. In general it would seem that the wheat growers and the corn-hog farmers have fared the best. North Dakota ranked first of all the states with payments amounting to $197 per farm person, more than three times the average for the country as a whole. South Dakota ranked second with payments amounting to $182, and Montana came third with $178 per farm person.[8] It seems quite evident that the highly commercialized wheat farmers received much more than their pro rata share of the benefits under the farm program. Next came the highly commercialized farmers in the corn-hog business. In Iowa the payments ranked fourth highest of all the states and amounted to $154 for every man, woman, and child in the farm population. Iowa's neighbor, Kansas, ranked fifth with $142 per farm person. Nebraska ranked sixth with $135 per farm person. Sugar payments also help to explain the relatively high payments per person in some states: Colorado averaged $102 per person, and Idaho ranked tenth with

[8] It should be emphasized that these data do not include the emergency expenditures in connection with the drought relief.

$95. Sugar subsidies also account largely for the fact that Louisiana's per capita share held up to $60 per farm person, just under the national average, while most of its neighboring states were far under the average of all states. Wheat, corn-hogs, and sugar seem to account for the high payments per farm person except in Texas, where they were $104, and in Arizona, where the per capita receipt was $95.

The South generally received low payments, although where cotton was the principal reliance the payments were higher than where a more general type of farming was practiced. This policy is consistent with the general tendency for commercialized farming to be favored by the programs. States dependent upon cotton, such as Mississippi, Alabama, and Georgia came nearer to receiving the national average than the agriculturally more diversified states, such as Kentucky, Tennessee, and West Virginia. In fact West Virginia received only $8 per farm person, only about one twenty-fifth of that received by North Dakota. With the exception of West Virginia, the states ranking lowest in the per farm person receipts of government payments were the New England and Middle Atlantic groups where commercialized agriculture is relatively of little importance.

An analysis of the statistics compiled by the Office of Government Reports shows that this pattern prevails in the distribution of all federal funds for agriculture.[9] See the data in table 1. For example, during the seven-year period 1933 to 1939, inclusively, the United States Department of Agriculture expended an average of $108 per farm person in its various programs to benefit the farmer.[10] During this same period loans averaging $174 per farm person were advanced to farmers. With the exception of Texas and Oklahoma the southern states all received less than the national average of the expenditures of the farm programs, and Oklahoma joined with the other southern states in receiving farm loans and other forms of aid in amounts below the national average.

Some may disagree with the thesis of this paper and maintain that the amount of cash receipts from the sale of major crops should largely determine the distribution to the states in proportion to the

[9] Consolidated State Reports of Selected Federal Expenditures, July 1, 1933–June 30, 1939, Office of Government Reports, Statistical Section, Washington, October, 1940.

[10] The figures for all U. S. Department of Agriculture expenditures include agricultural adjustment, soil conservation, land ultilization, agricultural experiment and extension service, forest service, and grants to agricultural colleges.

cash income which farmers receive from the sale of their main crops. Even on this basis an analysis shows that our present manner of distributing payments does not work out in an equitable manner. For example, the data in table 2 show that government benefit

TABLE 2. RATIO OF AGRICULTURAL BENEFIT PAYMENTS PER $1,000 CASH RECEIPTS FROM CROP SALES DURING THE PERIOD 1936–1939, INCLUSIVELY, BY DIVISIONS AND STATES*

Division and state	Benefit payments per $1,000 cash crop sales (1936–1939)	Division and state	Benefit payments per $1,000 cash crop sales (1936–1939)
United States	$177	South Atlantic (cont.)	
		Virginia	$111
New England	192	West Virginia	241
Maine	806	North Carolina	78
New Hampshire	501	South Carolina	146
Vermont	710	Georgia	173
Massachusetts	93	Florida	174
Rhode Island	137		
Connecticut	73	East South Central	161
		Kentucky	125
Middle Atlantic	167	Tennessee	156
New York	326	Alabama	217
New Jersey	240	Mississippi	154
Pennsylvania	113		
		West South Central	235
East North Central	124	Arkansas	174
Ohio	106	Louisiana	188
Indiana	104	Oklahoma	272
Illinois	100	Texas	262
Michigan	226		
Wisconsin	279	Mountain	278
		Montana	331
West North Central	206	Idaho	226
Minnesota	170	Wyoming	442
Iowa	147	Colorado	290
Missouri	164	New Mexico	321
North Dakota	473	Arizona	163
South Dakota	504	Utah	257
Nebraska	215	Nevada	366
Kansas	224		
		Pacific	167
South Atlantic	121	Washington	149
Delaware	259	Oregon	225
Maryland	96	California	162

* Original statistics extracted from Crops and Markets, January, 1940. Crops consist of cotton, tobacco, wheat, sugar, and corn-hog.

payments for all states amounted to $177 for every $1,000 the farmers received from the sale of their major crops during the four years from 1936 to 1939, inclusively. But in the various regions the ratio of benefits to cash income from the crops ranged from only

$121 in the South Atlantic states to $278 in the mountain states. The variation was even wider among the individual states.

Conclusion

Even with these facts before them there may be some who would defend the present inequitable agricultural policy. Certainly we would be among the last to recommend that the government's efforts to assist agriculture should be abandoned or even curtailed. We are merely trying to make the point that they might and should be vastly improved. As essential elements in a national policy for agriculture we submit three propositions:

(1) The distribution of all federal benefit payments to the states should be in proportion to the sizes of their farm populations.

(2) These federal contributions should not be paid directly to the farm operator but should be channelized into the support of essential services now financed by local taxation, with a consequent reduction in farm taxes. This pattern of aid is already well established in some of the states. Its value as a device for granting assistance is enhanced by the fact that it allows aid to be given without personal demoralization and the growth of attitudes of dependency and "gimme." For the operator of a family farm it removes one of the major factors now forcing him to forego diversification in favor of cash crop operations.

(3) The principle of equalization should be adopted on a federal scale so that areas benefiting from rural-urban migration would contribute a portion of their share in the provision of such services as modern schools and public health facilities.

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EXPORT SUBSIDIES AND AGRICULTURAL INCOME

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WIDE DIFFERENCES in estimates of the effectiveness of the 1938–39 Federal export subsidies on wheat indicate a need for a critical examination of the methods used in making such calculations.[1] Such an analysis will form the first part of this paper.[2] In the second section the relative advantages and disadvantages of export subsidies and other methods of increasing farm incomes will be considered.

Part I—*A Study of Estimates of the Effectiveness of the 1938–39 Program*

Two methods have been used to estimate the change in farm income resulting from the 1938–39 subsidies. One method, that used by Timoshenko, sought to determine what effect the increase in the carry-over in this country which would have occurred in the absence of the subsidies would have had on the home price. The other method, preferred by Department of Agriculture officials, involved a more indirect procedure. First, an estimate was made of the probable world price in the absence of the subsidies. From this price was then subtracted the amount by which the world price would have exceeded the home price if no bounties had been granted and the resulting figure represented the home price under that condition. That part of the difference between this calculated domestic price and the actual home price which could be attributed to the subsidies then constituted the gain per bushel resulting to United States wheat growers because of the subsidies. Each of the methods will be considered in turn.

[1] The subsidization of the sale abroad of 94,000,000 bushels of wheat and flour in the 1938–39 crop year resulted in an increase of $26,000,000 in agricultural incomes according to Timoshenko's estimates (Wheat studies, October 1940, pp. 85–86) while the increment was $57,000,000 according to the estimates of staff members of the Bureau of Agricultural Economics (The wheat situation, Sept. 25, 1939, p. 18). Calculations as to the extent of the increase in the domestic price range from 8 cents by Timoshenko (*op. cit.*) to 15 cents by Thomsen (The agricultural situation, August 1939, p. 9) and 17.5 cents in, The wheat situation, article (*op. cit.*).

[2] No theoretical analysis will be presented here of the conditions required if the expenditures for subsidies are to increase farm income by more than their own amount. The conditions under which a shift of a part of the good from one market to another would increase receipts are described by Joan Robinson, The theory of imperfect competition, pp. 179–208; by Gottfried Von Haberler in, The theory of international trade, pp. 296–333; and by Frederick V. Waugh and others in, Controlled distribution of a crop among independent markets, Quar. Jour. Econ., November, 1936, pp. 1–41.

A. *Effect of Increased Carry-Over on Home Price*

Timoshenko, in attempting to determine how much the home price would have been depressed by the increase in domestic carry-over in the absence of subsidies, began by calculating the average relationship between the annual average price of No. 2 hard winter wheat at Kansas City and the wheat stocks of the United States on July 30 for the period 1921–39. Figure 1 of this paper is a duplicate of his figure indicating the relationship between the two variables. On the basis that a decrease in exports of some 60,000,000 bushels and thus an increase in the United States carry-over to 313,000,000 bushels would have occurred if no subsidies had been paid, he said that

> Using the experience for the postwar period (figure 1) as a basis, we may estimate that such an increase of the wheat surplus in the United States would have caused the price of No. 2 Hard Winter to decline to about 60 cents per bushel. The actual price of No. 2 Hard Winter at Kansas City, 68 cents per bushel, was thus only about 8 cents higher than the price indicated as probable on the assumption of no subsidy and of exports of only 50 million bushels.[3]

Timoshenko presented absolutely no justification for assuming that a linear function satisfactorily represents the underlying relationship between carry-over and price. Another line, such as the broken line of figure 1, may actually represent the true relationship between the variables if, as is not implausible, a given percentage increase in the carry-over has a relatively greater depressing effect on prices when the carry-over is large than when it is small initially.[4] If the increase in the carry-over from 253 million to 313 million bushels had been accompanied by the decline in price indicated by the broken line, the price would have been around 55 cents, or 13 cents per bushel less than the actual one, rather than 8 cents less as Timoshenko indicated.[5]

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[3] Timoshenko, *op. cit.*, p. 86.

[4] The broken line appears to give a closer fit than does the straight line. No claim is made here that the broken line does actually express the true functional relationship between price and carry-over.

[5] In a note Timoshenko suggested that the $26,000,000 additional income from the gain per bushel of 8 cents may be an overstatement. He pointed out that the government preferred to subsidize the export of Hard Winters and that these are affected to a greater extent by increased exports than are other wheats. On the other hand, however, he underestimated the increased income because his total of $26,000,000 is the product of 8 cents multiplied by the amount of wheat sold in the approximately ten months in which the subsidy program was in operation, while the 8 cents increase was in the average *annual* price of No. 2 Hard Winter. The product of 8 cents times the *total* production of the crop year, 751,400,000 bushels, is $60,000,000.

An element of difficulty connected with this method which Timoshenko overlooked is determining how much of a given increase in the amount to be disposed of on the home market would be added to stocks. He apparently assumed that a given decrease in exports would result in an increase of the same amount in the carry-over. The amount which is actually added to these stocks will

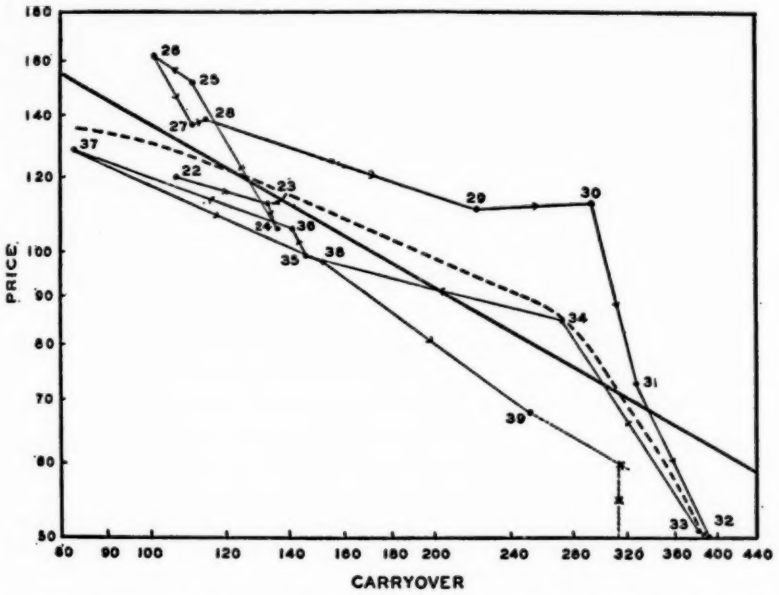

FIG. 1. RELATIONS BETWEEN AVERAGE ANNUAL PRICES OF NO. 2 HARD WINTER WHEAT AT KANSAS CITY FOR CROP YEARS ENDING JUNE 30 AND YEAR-END WHEAT STOCKS IN THE UNITED STATES, JULY 1, 1922–39.
(U. S. cents per bushel; million bushels; logarithmic scales.)

depend on the relative elasticities of the demand at home for wheat for utilization and for stocks.[6]

B. *Change in Spread Because of Subsidies*

Measuring the income-increasing effect of a subsidy by examining the resulting change in the spread between the home and foreign

[6] It might be argued that with the loan program in effect the domestic price and utilization would not have been affected by decreased exports and that the additional quantity remaining at home would simply have been added to holdings under loan. Then it would be necessary to show that increases in the domestic stock when held under loan have been no different in their effect on price than were increases in stocks prior to the loan program.

price requires answers to the following questions: (1) What is the effect of the subsidy program on world prices? (2) What would have been the excess of the world over the domestic price in the absence of changes in governmental policies for aiding agriculture?, and (3) What part of the change which occurs in the home price is the result of the subsidies?

1. *Effect on world price.* In analyzing the effect of the bounty program on the world price, an article in the Bureau of Agricultural Economics publication, "The Wheat Situation," first referred to another Bureau study in which it was concluded that no noticeable decline in world wheat prices occurred because of the subsidies.[7] Then the point was made that in the absence of countervailing factors the Liverpool price would have been depressed to some extent as a result of the bounties. On the basis of data recognized as inadequate, it was estimated that in the last fourteen years an increase of 60,000,000 bushels to the world supply has been connected with a reduction of 5 cents in the price at Liverpool.

Leading next to the introduction of the assumption that the prices in importing countries were not depressed because of the subsidies by the Federal government, the article indicated that:

> In conclusion, it appears that any depressing effect the subsidy may have had on foreign prices was largely offset by other factors. Fundamentally, the Liverpool price is related to world supplies and demand, and the quantity of wheat trade. The export subsidy did not change the world supply of wheat, although it did change the supply situation as regards the world supply ex-United States. Moreover, in 1938–39, the quantity of wheat which was sold in international trade would probably have been about the same with or without the United States subsidy.[8]

The only case in which an increase in the supply (a shift of the supply schedule to the right) of United States wheat on the world market because of the bounty program would have no effect on the total supply sold or on the price, would be that in which the supply curve for the rest of the exporters of the world was completely elastic in the relevant range. This would mean that at the going world price exporters in other countries would be satisfied even when a part of their exports to the world market were replaced by United States wheat. Such a perfectly elastic supply curve is un-

[7] The Wheat situation article was in the September 25, 1939 issue, pp. 15–18. The other Bureau study was not mentioned specifically but the summary fits an anyalsis by F. L. Thomsen which is described and criticized below.

[8] *Ibid.*, pp. 17–18.

likely. Unless it can be shown to have existed in 1938–39, the assumption that increased American exports had no effect on the world price is unjustified.

Timoshenko criticized the assumption and contended that to the contrary the subsidies had the effect of lowering the world price by at least 10 cents a bushel. He was justified in attacking the reasonableness of the assumption, but his own estimate of the depressing effect of the subsidies is itself based on wholly inadequate and inaccurate reasoning. In his analysis Timoshenko used a chart which is supposed to indicate the usual relationship between the wheat stocks of the four main exporting countries and the average

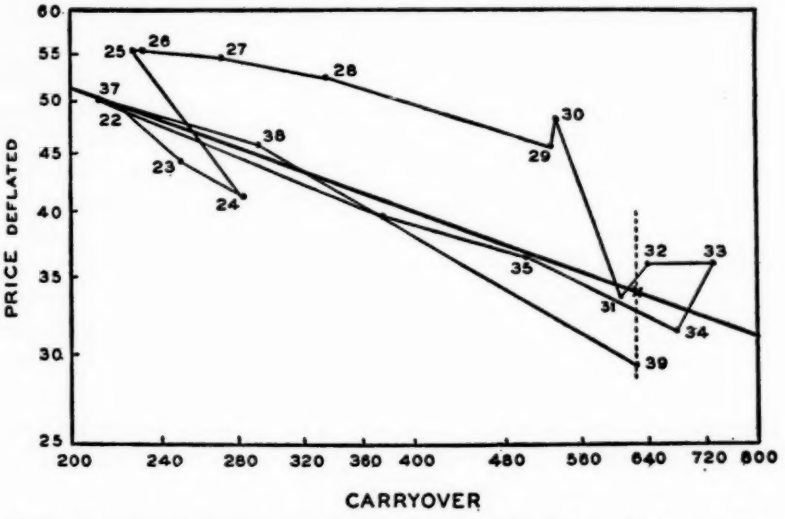

FIG. 2. RELATIONS BETWEEN AVERAGE ANNUAL BRITISH PARCELS PRICES (DEFLATED) FOR CROP YEARS ENDING JULY 31 AND YEAR-END WHEAT STOCKS IN THE FOUR CHIEF EXPORTING COUNTRIES, ABOUT AUGUST 1, 1922–39.
(Shillings per quarter; million bushels; logarithmic scales.)

annual deflated price of British parcels.[9] His diagram is reproduced here as figure 2. His explanation follows:

From the scatter diagram of figure 2 covering 18 postwar years, it may be estimated that the most probable deflated price of British parcels in 1938–39 would be about 36 (35.8)s. per quarter. During the nine latest years (from 1930–31), however, the deflated prices of British parcels had usually run somewhat below the average relationship for the postwar

[9] The actual price being deflated through the use of an index of wholesale prices.

period as a whole. Hence, on the basis of experience of these years a deflated price of about 34 (33.8)s. per quarter may reasonably be regarded as the most probable for 1938–39.

But the actual deflated price of British parcels, averaged for the crop year, was only 29.3s per quarter, or some 13 to 14 per cent below the lower estimate of the most probable price. Expressed in currency, our estimate of the price reasonably to be expected under the supply-demand conditions of 1938–39 would be, at the general price level for that year, about 27 (26.7)s. per quarter, instead of 23.2s., the actual price of British parcels in 1938–1939. The actual price in 1938–1939, in currency, was below the lower estimate of the most probable price for that year by about 3½s. per quarter or 10 cents per bushel. Practically the same result would be obtained from an interpretation of British wheat prices in the light of the world wheat carry-overs, when the carry-over on August 1, 1939, is adjusted for the security stocks accumulated by various European governments during 1938–1939.[10]

Timoshenko made a mistake in reasoning that since the deflated price in 1938–1939 was 13 or 14 per cent below that most likely on the basis of stocks that therefore the price in currency was also 13 to 14 per cent below its most probable price. He overlooked the fact that the declines in the two are not likely to be identical when fluctuations occur in the index of wholesale prices used in the deflation process. The decisive question involved is the extent to which subsidies caused the actual price to diverge from that to be expected on the basis of the usual relationship between stocks and the average price measured in currency. The decision as to whether or not to hold stocks will depend on actual and expected prices in terms of money. It is the monetary price which is important in considering how much of a depressing effect on the world price resulted because of the subsidy program.

Figure 3 presents a scatter diagram with stocks in the four main exporting countries and actual prices as the variables. This graph shows that the divergence of the 1938–1939 average price from that most probable on the basis of the amount of stocks is not nearly as great as when deflated prices are used. The price to be expected was 24.4s, 1.2s rather than 3.5s more than the actual price for the year. The actual price was thus 3.4 cents rather than 10 cents less than the most probable price. If in, The Wheat Situation, estimate of the increase in farm incomes resulting from the subsidies allowance is made for a decline of 3.4 cents in the world price because of the program, the total gain would be $46,000,000 rather than $57,000,000.

[10] Wheat studies, October 1940, p. 83.

Another method of attempting to determine whether the world price was depressed because of the subsidies was used by Thomsen.[11] The results of a multiple correlation analysis which had world wheat supplies and index numbers of wholesale prices in Great

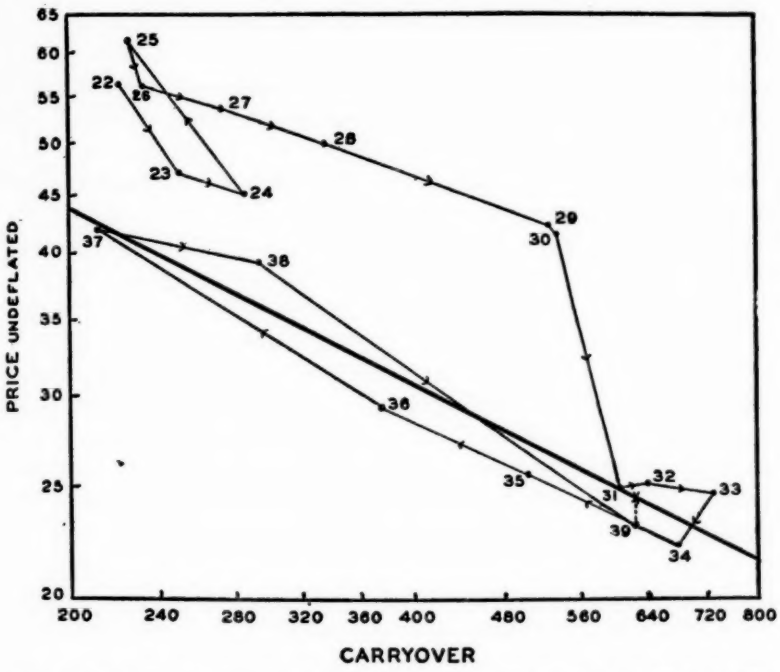

FIG. 3. RELATIONS BETWEEN AVERAGE ANNUAL BRITISH PARCELS PRICES (UNDEFLATED) FOR CROP YEARS ENDING JULY 31 AND YEAR-END WHEAT STOCKS IN THE FOUR CHIEF EXPORTING COUNTRIES, ABOUT AUGUST 1, 1922–39.
(Shillings per quarter; million bushels; logarithmic scale.)

Britain as the independent variables were used to obtain a computed average price for British parcels at Liverpool for each of the years from 1924 to 1938. The fact that the actual price for 1938 was very little different from this computed price led Thomsen to conclude that "On the basis of this test, we can discern no appreciable effect of the United States wheat-export subsidy upon world prices of wheat."[12] A possibility exists, however, that the export subsidy program had the effect of decreasing the regression coefficient re-

[11] F. L. Thomsen, The wheat export subsidy, The agricultural situation, August 1939, pp. 9–10.
[12] *Ibid.*, p. 10.

lating wheat supplies and the price in 1938 and that a compensating change occurred at the same time in the relationship between the wholesale price level and the price of wheat or that changes in some variable not included in the analysis may have tended in 1938 to increase wheat prices by approximately as much as the bounty program tended to decrease them.[13] Thomsen points out that "It should be noted, however, that data are not yet available for a sufficient period of years to warrant great confidence in such a statistical analysis, because of technical difficulties which make it very desirable to have a large sample of observations."[14]

2. *Price spread in absence of policy changes.* A second main problem is determining the amount by which the world price would have exceeded the home price in the absence of changes in governmental policy. Estimates as to this spread vary considerably. For example, Thomsen suggested that under conditions of supply similar to those existing in 1938 prices at Kansas City are ordinarily about 15 cents below those at Liverpool.[15] In the wheat situation article the spread was estimated at 28 cents on the ground that exports of 100,000,000 to 110,000,000 bushels of wheat from the United States have in the past been connected with a price to the growers in the United States approximately 28 cents less than the Liverpool price.[16] However, the price differential which would exist in the absence of changes in governmental policies depends on factors other than the amount exported in the period. The decisive factors include supply and demand conditions on the two markets, shipping and insurance costs, and tariff and other restrictions. The amount exported will vary and tend toward that amount required for an equilibrium. The difficulty of determining what the spread

[13] One possibility is that growing prospects of war caused an increase in the amount of wheat which would be demanded at various prices.

[14] Thomsen studied the effect of the subsidies on the world price in an attempt to determine whether the decrease in the spread between the home and the foreign price during the period had resulted mainly from a decrease of the world price or from an increase in the domestic price. He concluded that to the degree that the statistical method was valid it supported the results of his theoretical analysis, that the export subsidy would have a much greater effect in raising home than in lowering foreign prices. In the theoretical analysis, however, Thomsen neglected the possibility of shifts in the curves because of the subsidies. For example, the setting up of anti-dumping duties by importing countries may lead to such a shift of the demand curve of United States exports to the left as to more than offset the income-increasing tendencies resulting when the elasticity of the export demand is greater than that on the domestic market.

[15] Thomsen, *ibid.*, p. 9.

[16] Wheat situation, Sept. 25, 1939, p. 18.

would have been in the absence of the bounties is great because of the wide and frequent fluctuations which occur in it.

3. *Effects of subsidies on home price.* If both the world price and the spread in the absence of changes in governmental policies for aiding agriculture are determined accurately, it is possible then to calculate what the domestic price would have been under those conditions. The excess of the actual price in the United States over this computed price would represent the gain per bushel resulting from changes in governmental policies. In a period in which several such changes occurred, the problem of determining what part of the gain was due to the initiation of the subsidy program and what part was due to other changes in policies would have to be solved in order to determine the effectiveness of the bounty expenditures. In all of the studies which have been analyzed in this paper, no attempt was made to determine what part of the estimated increase in income was due to the subsidies and what part was the result of the adoption of the loan program. It may not be impossible under certain conditions to separate the price-raising effects of different governmental programs to aid the farmers, but until this is done it will be impossible to determine satisfactorily the effectiveness of export subsidies in increasing agricultural incomes.

The analysis which has been presented thus far shows that Timoshenko's estimate that the export bounty increased farm incomes by $26,000,000 is too low, and that the estimate of $57,000,000 by Bureau of Agricultural Economics officials is too high. No attempt will be made here to determine the amount by which farm incomes increased as a result of the subsidies. The estimates of Timoshenko and of members of the BAE staff, when revised to meet the criticisms made above, show that the increase in farm incomes was somewhat in excess of the government's $26,000,000 expenditure for the bounties. Nevertheless, it is necessary to consider possible alternatives to export subsidies in order to decide whether or not such bounties constitute the best possible method of increasing farm incomes if the government wishes to do so.

Part II—*Relative Advantages of Export Subsidies in Increasing Farm Incomes*

To be considered are the relative merits of export bounties as compared with direct grants to farmers, a two-price system on the

home market, and crop restriction as methods for increasing agricultural income.

A. *Export Subsidies Versus Direct Grants*

Most, if not all, of the money which farmers receive in excess of the bounty is obtained for all practical purposes from a tax on the domestic purchasers, who pay a higher price than they otherwise would for the subsidized commodity. Theoretical analyses such as that by Hicks[17] show that the injury to these buyers of the good is less if the tax is in the form of a deduction directly from their incomes rather than an increase in the price of the good. With the higher price in effect, the individual buyers not only lose the amount of the tax but also are unable to reach the maximum utility positions which they could have attained if the same sum were paid as a direct tax because with the increased price they cannot gain as much utility as formerly from substituting this commodity for other goods.

A situation may exist when for political or other reasons it is not feasible to increase income tax rates in order to obtain the added income for the farmers. In that case a government which desires to increase agricultural incomes ought to consider whether or not stimulating the foreign sale of the crop by means of export subsidies is the best available method of using its funds to aid the farmers.

B. *Foreign Versus Domestic "Dumping"*

An alternative to increasing the amount of the crop sold abroad is that of stimulating the domestic disposal of the good by selling at reduced rates or giving to the poor the goods removed from the regular home market. Increases in the domestic price resulting from export subsidies fall particularly heavily on the lower-income groups, which spend a higher percentage of their incomes for agricultural commodities than do the rich. This regressive effect is avoided or at least reduced by an arrangement for domestic "dumping." In that case the poor in the United States get the benefits of additional goods, while with export subsidies in effect the purchasers abroad, whether they be rich or poor, gain to the extent that prices fall there.

The main disadvantage of methods which increase the consumption of the good by low-income families in the United States is that

[17] J. R. Hicks, Value and capital, pp. 38–41.

their effectiveness in increasing farm incomes is likely to be relatively less than that of export subsidies. With an export bounty program in operation, farm incomes will increase by more than the amount of the bounty because of the increase in the revenue from a larger volume of sales abroad.[18] In contrast, the domestic disposal of the "surplus" will be likely to lead to a gain in farm incomes which is less than the cost of the program to the government. People getting the good at a reduced price can be expected to decrease their expenditures for it on the "full price" market.[19] When a two price system is used on the home market, the relative effectiveness of increasing incomes by domestic disposal as contrasted with foreign sale by means of export bounties will depend on the relative elasticities of the demand curve of the poor in the United States and of the demand curve for our wheat abroad and the shifts which may result in the demand schedule on the "full price" market at home because of the adoption of the two-price domestic system or in the "export opportunity" curve consequent to the introduction of export bounties.

If an expenditure for export subsidies is more effective in increasing farm incomes than is the same expenditure to stimulate the domestic disposal of the crop, the choice in deciding how to spend the funds available for the disposal of farm products is likely to be between obtaining a larger income for the farmers by using export subsidies and as a result injuring the home consumers, particularly those in the low-income groups, or increasing the real income of the poor by disposing of the goods at home, and, as a consequence of this decision failing to obtain the greatest possible income for the farmers. At times a combination of the two methods may be used effectively, as when the marginal revenue from the sale of additional units abroad becomes negative before all the goods

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[18] Provided that the elasticity of the curve which indicates the amount of United States wheat which could be sold on the world market at various prices exceeds unity. Only in this case would it pay to dispose of the goods abroad, although it might pay to remove them from the home market even though this curve is inelastic.

[19] If the elasticity of demand of low income families is greater than unity, however, price reductions on sales to them will lead to an increase in farm incomes in excess of that occurring at the expense of the government. While arrangements such as the food stamp plan may prevent expenditures for food from declining, they offer no assurance that the incomes of the farmers of the United States, and, more specifically, the incomes of producers of the good on the surplus list, will increase by an amount at least as large as the bounty. It is not unlikely that as a result of the stamp plan the poor will use less of their own funds for the purchase of goods on the surplus list.

being removed from the home market are sold on the world market.[20]

C. *Crop Limitation*

Another alternative to export subsidies as a policy for increasing farm incomes by reducing the amount sold on the home market, is limiting the domestic production of the good. The latter policy would be more the effective as long as the marginal cost of adding dollars to farm incomes by means of payments to reduce output is less than the marginal cost of increasing incomes by subsidizing additional exports. Under certain conditions both methods might be used at the same time in order to maximize farm incomes. The maximum increase in agricultural incomes from a given expenditure by the government could then be gained by apportioning the funds between the two programs in such a way as to equalize the marginal cost of each.

In order to determine the net effect of bounties for crop limitation on agricultural income, it would be necessary to determine the extent to which such payments resulted in an increased production of other crops through the use of the resources freed as a consequence of the program, and what effect the increased output had on the income from the sale of these goods.

The substitution, in whole or in part, of payments to reduce production for expenditures for export subsidies may at times increase the gain in income for the farmers resulting from the use of Treasury funds to aid agriculture. From the point of view of domestic purchasers of the good, however, both are injurious because if successful they increase the home price, hurting particularly the low-income groups. An additional harm which is likely to result from payments for crop limitation is the decrease in employment opportunities which accompanies such bonuses.

Conclusions

Even though export subsidies were successful in increasing agricultural incomes by a sum larger than the Treasury's expenditure, as the evidence of Part I indicates was the case in 1938–39, other methods would be more desirable to use when the government desires to aid the farmers. If politically feasible, a direct tax to pay the

[20] A discussion of the advantages of differential prices on the domestic market was presented by Waugh in, Market prorates and social welfare, JOUR. FARM ECON., 20: 403–416, and was followed by a criticism by Stigler in *ibid.*, pp. 573–586, and a rejoinder by Waugh in *ibid.*, pp. 587–589.

farmers an amount equal to the increase in their income which would result from the bounty would be less injurious to the general public. If the increased income is to be obtained by indirect taxes, that is, by higher domestic prices, gifts of the good to low-income groups or sales to them at reduced rates avoids or reduces the regressive effects of higher prices on the regular home market. Disposal of additional goods among low-income families in the United States may be less effective than export subsidies in increasing agricultural incomes. In contrast, payments to reduce domestic production may be even more effective than export bounties in increasing incomes, but do not reduce the injurious effects resulting from higher domestic prices and would in addition result in difficulties for those who become unemployed because of the decrease in production.

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EXPECTATION AND PERFORMANCE—RELATED TO CONSERVATION AND PRODUCTION ADJUSTMENTS IN THE MIDWEST DAIRY REGION

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FARM PRODUCTION plans over periods of time are based on expectations concerning the future.[1] Farmers rely most on past experience and knowledge of existing conditions, and they are influenced also by information concerning probable future developments. However, there is usually a wide divergence between production performance that is actually realized as a result of plans based on imperfect expectations and that performance which would have been realized if plans could have been based on well informed expectations. Research and extension workers, especially those in farm management, are charged with the responsibility of obtaining and making available to farmers information that will help them to appraise future expectations more accurately and thus reach production decisions that will narrow this divergence and result in more efficient use of resources.

Constant new developments, both in technique and in price, are characteristic of our dynamic agriculture. It is widely recognized that farmers make changes in their production plans with the passage of time in response to these changed conditions. Public programs designed to assist farmers in making desirable decisions have covered a wide field in recent years, yet relatively little attention has been given to a consideration of whether the desired adjustments are actually being made as a result of these programs. Still less attention has been devoted to the probable effects of new technological improvements or price changes and to the consequent adjustments individual farmers or groups of farmers in various regions need to make in their future production plans. In order to narrow the divergence between the performance that is actually realized and that which would have been desirable, more information is needed with respect to probable future conditions.

[1] T. W. Schultz in his article, Theory of the firm and farm management research, JOUR. FARM ECON., 1939, 21: 570–594, indicates the nature of expectations on which individual farmers' decisions are based. Plans for production on the part of agriculture as a whole, implicit in our public programs, are also based on expectations concerning probable future conditions. They aim to obtain that production performance which is socially desirable. Both types of expectations and performances are referred to here.

A Study of Probable Effects in Dairying

A pioneer study recognizing the need for work along the lines suggested here was made of the agricultural conservation program in the midwest dairy region in 1937.[2] Advance estimates of probable effects of the program in a number of areas in this region indicated that some increases in both feed and dairy production could be expected to result from the program within a few years. Events since 1937 have proved that these estimates were largely correct. This study is of special interest here not only because of the accuracy of the estimates that were made but also because the analytical procedure used may prove valuable in estimating the effects of other developments including those causing change in price relationships.

Both the 1936 and 1938 Agricultural Adjustment Acts placed primary emphasis on conservation of natural resources, but the need for production adjustments required to obtain parity income for agriculture also was emphasized. Considerable difference of opinion concerning the probable effects of the Agricultural Conservation Program, especially in the midwest dairy region, existed at the beginning of the program in 1936.[3] Enough time has now passed for the program to have had considerable effect. It is now possible to examine the findings and conclusions of the 1937 study and compare them with the actual events since then. It is realized, of course, that the conservation program cannot be considered responsible for all of the changes observed in this region, but it will be possible to draw some convincing inferences. Although the 1937 study was concerned with learning only the effects of the conserva-

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[2] S. E. Johnson, R. L. Mighell, and F. T. Hady, Probable effects of the agricultural conservation program on livestock production in the Midwest Dairy Region, Bur. Agr. Econ. (Processed). This study is in 5 parts. Part 1 is a summary. There is one report for the areas studied in each of the states, Michigan, Wisconsin, Minnesota, and Iowa.

[3] For example, no general agreement concerning probable livestock adjustments resulting from the conservation program was reached at a discussion of this subject by a group of economists in 1936 according to a report by A. F. Vass, and O. V. Wells, Livestock adjustments, JOUR. FARM ECON., 19: 508–519. A year later it was concluded that the AAA has had few important effects on regional division of agricultural production in an article by H. B. Rowe, Effects of the AAA on regional specialization in agriculture, JOUR. FARM ECON., 21: 31–43. Walter W. Wilcox reached this important conclusion regarding Iowa, "a conservation program such as the one in operation in 1936 and 1937 can have little or no influence on the price and income received from the sale of grain and livestock; certainly not in years of normal and above normal crops," Livestock production in Iowa as related to hay and pasture, Bul. 361, p. 58, Iowa Agr. Expt. Station.

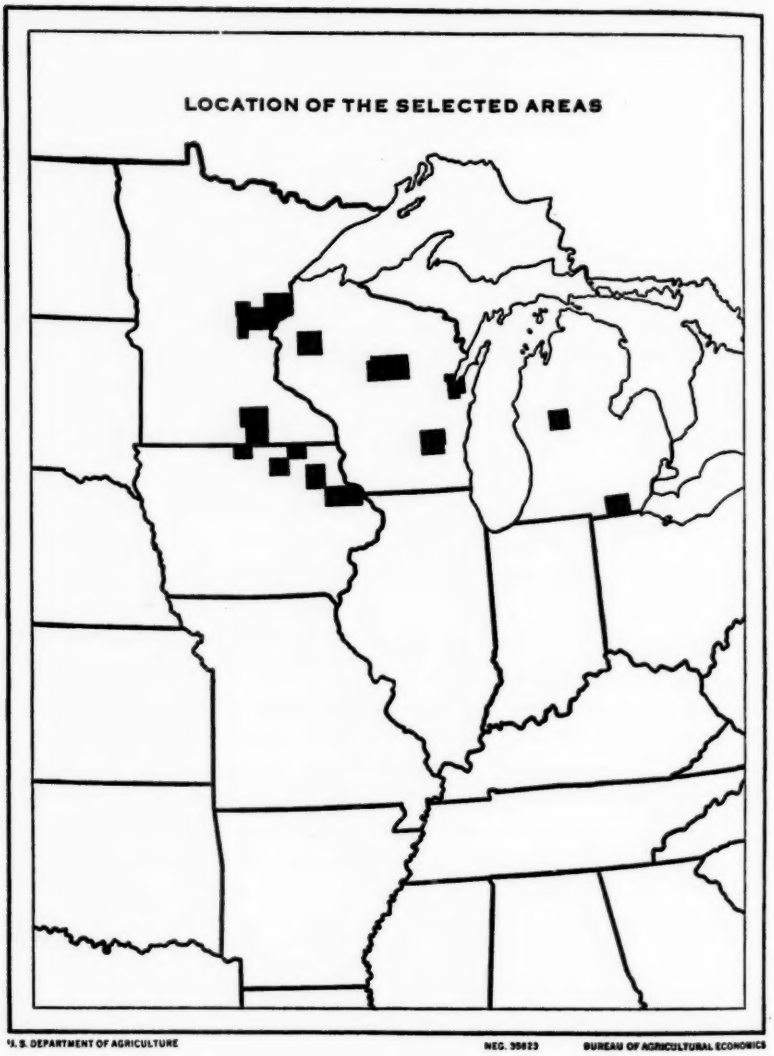

FIG. 1. LOCATION OF AREAS IN MIDWEST DAIRY REGION SELECTED FOR PROBABLE EFFECTS STUDY

tion program, it will be useful in the analysis that follows to point out important developments caused by other factors. The main purpose here is to indicate the usefulness of the advance estimate

method in planning and to call attention to important developments influencing the agriculture of this region.

Method of the Probable Effects Study

The procedure followed in the 1937 probable effects study of dairying was to select a number of relatively small areas located throughout the midwest dairy region for rather detailed study. The location of these areas is shown in figure 1. Records of business operations on a number of farms in each of the areas provided the basic data. Some individual farm data also were available from local AAA offices. Statistics from crop and livestock reporting services in the various states were used to observe past trends in counties and groups of counties. The estimates of probable future effects of the program were developed for each of the areas studied. However, they may be considered broadly representative of the states in which they are located.

The estimates of probable effects were those expected within a period of 5 or 6 years providing no important changes in plans or scope of the program as it existed in 1936 were made. Some adjustments in crop and livestock systems because of recent droughts were allowed for, but no allowance was made for possible effects on this region of the program in other regions. It was assumed that no important change in the general price level or price relationships would occur although the likelihood of somewhat lower livestock prices than those prevailing at the time because of drought shortage in feed supplies was considered.

The first step was to examine changes in land use and live-stock numbers since 1920 and to obtain an accurate picture of the prevailing situation. Farm organizations were studied to learn whether any definite relationship between the crop and livestock systems existed. The effects on total feed supply of complying with the program and the resulting effects of such changes on livestock production were then estimated. Some assumptions concerning results of changes in feeding practices were required in this process. Finally, the probable effects on farm income were estimated.

The problem of estimation was approached from the standpoint of determining maximum limits of the program. Computations were made to ascertain the influence on feed production of shifts in acreages involving full participation in the program and maxi-

mum diversion payments. The decreases in depleting crops were divided between corn and small grain approximately in proportion to their 1935 acreages, and the increases in conserving crops were added to alfalfa and clover and timothy hay approximately in proportion to the 1935 acreages of alfalfa and all other tame hay.

The Advance Estimates of Probable Effects

The estimated changes in feed production in terms of total digestible nutrients varied from a 1.6 per cent decrease in north central Wisconsin to a 9.0 per cent increase in southeastern Minnesota. The changes in feed production for all areas studied are shown in table 1.

TABLE 1. AREA ESTIMATES OF PERCENTAGE CHANGES IN TOTAL DIGESTIBLE NUTRIENTS FROM PARTICIPATION IN THE PROGRAM AS COMPARED TO THE 1935 CROP PATTERN

Area	Percentage change in total digestible nutrients
Corn Belt Transition Areas	
Northeastern Iowa	+2.6
Southeastern Minnesota	+9.0
Southeastern Wisconsin	+2.7
Southeastern Michigan	+5.4
Areas With Few Alternatives	
East Central Minnesota	+6.2
Northwestern Wisconsin	+2.7
North Central Wisconsin	−1.6
East Central Wisconsin	+7.1
West Central Michigan	+7.4
Simple Average of All Areas	+4.6

The shifts in cropping pattern involved in the program meant not only a larger total feed production but more feed nutrients in the form of roughages as compared to concentrates. Therefore, it appeared that a shift to more roughage consuming livestock, mainly dairy cattle, would be encouraged. Estimates of the effects on dairy output were made. These were largely on an individual farm basis and involved budgeting individual farm organizations for the purpose of determining the effects of projected changes. Area data concerning production responses in the past also were used in arriving at final estimates. A time period of several years was allowed in order that nearly complete adjustment might be made to the changed conditions.

Estimates of changes in dairy output varied from one region to another depending upon the nature of the additional feed expected and the stage of the area in dairy development. In areas such as northeastern Iowa, where the cows were underfed and the average production per cow was low, the effect on dairy production of an increased quantity of feed nutrients, and the increased protein content of the roughage was expected to more than offset the effect of less concentrates. Consequently, the estimated increase in dairy production would be somewhat greater than that of feed supply; an increase of 4 or 5 per cent in butterfat production was expected.

The effect of a smaller proportion of concentrates and a larger proportion of roughages in the total feed supply was considered much more important in areas further advanced in dairy development, with cows fed at a higher level but with relatively small quantities of grain in the ration. These conditions were predominant in the northern areas and to some extent in the corn belt transition areas. Therefore, it was concluded that percentage changes in milk production would be slightly smaller than those of feed production in most Minnesota, Wisconsin, and Michigan areas. Estimates of change in butterfat production varied from 2 to 5 per cent in these areas.

With respect to income, it was concluded that farmers would realize a net gain from full participation in the program. The anticipated increase in feed supply would allow for additional dairy production without reducing production in other enterprises. Increased livestock expenses would be more than offset by reduced crop expenses. The value of added dairy production was considered a net gain. Payments for diversion and conservation practices would be in addition to this net gain.

Recent Developments in the Region

A consideration of the actual situation that has resulted during the 5-year period 1935–40, reveals that actual conditions have been similar to those that the probable effects study assumed would occur. Important changes in production techniques, the probable effects of which were not estimated, were introduced. These include the wider use of hybrid corn and better yielding varieties of other crops. Some adjustment in crop and livestock production because of drought were made as assumed. No important changes in price relationships or in the general price level took place although live-

stock prices, especially hogs, continued to be relatively low compared to feed prices. The period of 5 or 6 years allowed for the program to have its effects has now almost elapsed.

Examination of the 5-year period reveals that important changes in livestock and feed production have taken place in the four states in which the area studies were made. Most significant is the marked increase in dairy output. Changes in dairying are shown in table 2.

TABLE 2. PERCENTAGE CHANGES IN NUMBER OF MILK COWS, ANNUAL PRODUCTION PER COW, AND MILK PRODUCED ON FARMS IN THE MIDWEST DAIRY REGION, 1935 TO 1940*

States	Percentage changes from 1935 to 1940		
	Number of milk cows	Annual production per cow	Milk production
Michigan	+5.0	+10.1	+15.6
Wisconsin	+6.7	+ 8.7	+16.0
Minnesota	+ .1	+13.7	+13.8
Iowa	−3.1	+15.7	+12.2
Midwest diary region	+2.3	+11.8	+14.6

* Data for 1940 are preliminary.

The increase in milk production from 1935 to 1940 is part of a trend that has continued over a longer period. Milk production in these four states increased 21 per cent from 1930 to 1940.

Attention must be called to the fact that these data are for the entire state in each case, although the advance estimates were for selected areas. This must be noted especially in the case of Iowa, as the estimates were intended to apply only to the northeastern dairy area in Iowa. Apparently, the increase in milk production has resulted both from increases in number of milk cows and increases in the annual production per cow. Increases in production per cow have been especially important in Iowa and Minnesota.

Few outstanding changes took place in other lines of livestock production. All cattle other than milk cows increased by 6 per cent in these four states, but this has not been more than enough to provide replacements for the addition to dairy herds. Hog numbers show a marked increase if comparison is made between 1935 and 1940, but no change is apparent if numbers in 1934 and 1940 are compared. Hog numbers were abnormally low in the early part of 1935 owing to reduced feed supplies caused by drought, but recovered to usual numbers in 1936 with normal crop production.

The number of sheep on farms was slightly higher in 1940 than in 1935. Of considerable importance, because it released large quantities of feed for livestock production, was the 11 per cent decline in number of horses.

The marked expansion in dairy output, and the moderate increase in other livestock products, has been made possible largely by an increase in feed production. Computations have been made to determine the actual changes in total number of digestible nutrients from feed crops harvested from 1935 to 1940. The percentage changes are shown in table 3. The changes indicated between 1935

TABLE 3. PERCENTAGE CHANGES IN NUMBER OF DIGESTIBLE NUTRIENTS HARVESTED FROM FEED CROPS IN THE MIDWEST DAIRY REGION, 1935 TO 1940*

States	Percentage change from 1935 to 1940		
	Feed production from principal crops	Allowance for added pasture	Total adjusted feed production
Michigan	+ 2.7	+2.5	+ 5.2
Wisconsin	+15.2	− .4	+14.8
Minnesota	+ 8.7	+4.7	+13.4
Iowa	+18.6	+1.7	+20.3
Midwest dairy region	+13.1	+2.4	+15.5

* Based on 1940 preliminary data.

and 1940 represent the normal trend in feed production for the region as a whole. However, a relatively high yield for corn in Iowa in 1940 as compared to 1935 makes the total increase in feed production shown in table 3 higher than normal for that state. On the other hand, the increase in total feed production shown for Michigan probably is below normal due to relatively low yields for several crops in 1940 as compared to 1935.

In order to obtain an accurate estimate of the change in production of feed nutrients it is necessary to make allowance for the fact that some cropland was shifted to pasture. The computations summarized in table 3 assume that this pasture land yields only three-fourths as many feed nutrients as does land in principal feed crops. The adjusted figures in table 3 represent the estimated change in total feed production.

For the region as a whole feed production increased 15.5 per cent compared to an increase of 14.6 per cent in milk production. The

change in milk production was slightly less than that of feed production. As the number of cows increased by only 2.3 per cent, it is apparent that substantially more feed was fed per cow. Milk production per cow increased by 11.8 per cent mainly as a result of this more intensive feeding. The quantity of all feed produced classified as roughage increased by about the same percentage as did that classified as concentrates. However, if the reduction in acreage of feed crops harvested and the shift to more pasture is taken into account, it is found that the quantity of roughage feed has increased slightly more than concentrates. An offset against this is some increase in the protein content of roughage feeds caused by production of more alfalfa and soybeans.

The response in milk production to increased quantities of feed varied from state to state. In Iowa, for example, the number of milk cows was reduced, but milk production per cow increased markedly. The percentage increase in milk output was considerably less than the increase in available feed supplies. However, the quantity of feed available for feeding dairy cattle probably did not increase by as large a percentage as shown in table 3, for grain supplies held in storage increased markedly from 1935 to 1940. Still, it appears that substantially more feed was fed per cow. The situation was different in Michigan where the additional feed was disposed of by feeding more milk cows as well as by feeding more per cow. Milk production increased by a larger percentage than did feed production. In Wisconsin and Minnesota the number of milk cows and production per cow both increased. Milk and feed production increased in approximately the same proportions.

Effects of the Conservation Program

The changes in feed and livestock production for the entire region, summarized in the foregoing paragraphs, are much greater than those that were anticipated as probable results of the conservation program. However, it is significant that the direction of change estimated in the 1937 probable effects study has been correct. Also, it needs to be recognized that the estimate of change in feed and livestock production made in 1937 covered only those changes expected to result from the anticipated shift in the crop pattern. The likelihood of improvement in crop yields resulting from other developments was recognized, but no specific estimates of their probable effects were made. A large part of the increase in

feed production since 1935 can be explained by developments such as increased use of hybrid corn and other higher yielding varieties of crops as well as by improved soil fertility caused by better conservation practices.

The changes in the midwest dairy region crop pattern estimated as likely in the 1937 study of selected areas have been realized rather completely. Table 4 shows that there has been a marked shift in

TABLE 4. PERCENTAGE CHANGES IN ACREAGE OF PRINCIPAL FEED CROPS HARVESTED AND ACREAGE OF SOIL-CONSERVING AND SOIL-DEPLETING CROPS IN MIDWEST DAIRY STATES, 1935 TO 1940*

States	Percentage change from 1935 to 1940		
	Acres of principal feed crops harvested	Acres of soil-conserving crops	Acres of soil-depleting crops
Michigan	−3.3	+ 7.6	− 9.6
Wisconsin	+ .5	+31.2	−14.9
Minnesota	−6.2	+ 7.9	−10.3
Iowa	−1.7	+36.6	− 9.0
Midwest dairy region	−3.0	+20.7	−10.4

* Data for 1940 are preliminary.

land from soil-depleting to soil-conserving crops. The acreage in depleting crops has been reduced more than 9 per cent in the case of each state.

The shifts within the crop classifications, soil-depleting and soil-conserving, have also been about as estimated. The acreages in corn and small grain have been reduced so that each constitutes approximately the same proportion of the depleting crop acreage in 1940 as in 1935. For example, 44 per cent of the depleting crop acreage was in corn and 56 per cent was in small grains in 1935 while 46 per cent was in corn and 54 per cent was in small grains in 1940. The acreages in alfalfa and all other tame hay also have been adjusted so that each comprises about the same proportion of all land in tame hay in 1940 as in 1935. In 1935, 31 per cent of all tame hay acreage was in alfalfa and 69 per cent was in other tame hay, while in 1940, 32 per cent was in alfalfa and 68 per cent was in other tame hay. Substantially the same results are obtained if similar comparisons are made for each of the states in the region.

For the region as a whole, the proportion of all land in principal feed crops devoted to soil-conserving crops increased from 23.9

per cent to 29.7 per cent from 1935 to 1940. If the increase in pasture land made possible by a 3.2 per cent reduction in the acreage of principal feed crops is taken into account, it will be found that a somewhat greater shift to more conserving crops in place of soil-depleting crops was made. In all states there has been a marked shift from corn and small grain to various kinds of hay. Although this shift has been somewhat less than estimated, it is significant that the shift out of corn and small grains has left the depleting crop pattern almost exactly as estimated. Similarly the shift into alfalfa and other hays has left a conserving crop pattern about as estimated.[4]

In order to test the conclusions of the 1937 study, it is interesting to determine what changes in feed production took place as a result of the changes in crop pattern alone. This has been done by applying the 1929–38 average yields to the acreages of various crops harvested in 1935 and 1940 and noting the change in normal feed production capacity. If the addition to acreage of pasture land is taken into account, these computations show that feed production capacity of the region increased by approximately 3 per cent as a result of changes in the crop pattern. This may be compared to the average of 4.6 per cent increase in feed production estimated for a number of areas located throughout the region by the 1937 study. If the shift from depleting to conserving crops from 1935 to 1940 had been as great as the program sought, a somewhat greater increase in normal feed production capacity undoubtedly would have occurred.

The 3 per cent estimate can be considered conservative, for the conservation program may be held responsible for some increase in crop yields. Perhaps something like one-third of the 15 per cent increase in feed production can be directly attributed to the conservation program while the remainder probably has been caused by greater use of hybrid corn, alfalfa, and other high nutrient yielding crops and the improvement in pastures. Even these factors have doubtless been influenced by the conservation program.

The agricultural conservation program can be considered re-

[4] Approximately the same results are obtained if the comparison is made between the average for the years 1928–32 and 1940. The total acreage in principal feed crops decreased less than one per cent from the 1928–32 level to 1940. During this period the acreage in soil-conserving crops increased 25 per cent while the acreage in soil-depleting crops decreased 8 per cent. It is significant that during the same period feed production as measured by total digestible nutrients increased 21 per cent in these four states.

sponsible for some increase in farm income and for much progress towards better conservation of soil resources. One effect of the program has been to cause an increase in feed production, and this has been used to advantage in producing additional livestock products, mainly dairy. Although the conservation program undoubtedly has caused some increase in dairy output in other regions during this period, demand for dairy products also increased. As a result, it was possible for farmers to sell the additional milk at no reduction in price. Since total production of livestock products has increased and prices have not been reduced, it is apparent that gross income of farmers has increased as a result of the program. Some reduction in crop costs probably has been realized by the shift from corn and small grain to more hay and pasture, but this has been offset partly by increased livestock costs caused by more livestock. The net effect probably has been some increase in net income. As another immediate benefit, farmers have received payments for participation in the program. Better conservation of soil resources realized under the program constitutes a longer term benefit which needs to be taken into account.

Significance of Recent Developments in the Region

While the agricultural conservation program can be considered responsible for a part of the increase in feed and livestock production during the five-year period 1935–40, other developments are also responsible for a major part of the change. Crop yields have improved as a result of increased use of higher yielding varieties. Hybrid corn is an outstanding example. The shift in the crop pattern to more high-nutrient-yielding crops such as alfalfa and soybeans in place of the relatively lower yielding hays and small grains accounts for a large part of the increased feed production. Price conditions and the nature of the additional feed caused it to be most profitable for farmers to devote most of the added feed to dairying.

The existence of conditions that favor dairying and increased total livestock production has interregional implications. The trends in progress apparently have caused this region to improve its competitive position in dairying. The fact that total dairy output has increased markedly while total expenses of production have increased by only a small amount means that unit costs of production in dairying have been reduced. As a result of the developments described, farmers in this region are now in better position to with-

stand the effect of increased competition from other regions which might result in lower dairy prices. The conservation program can be considered party responsible for this changed situation.

Advance Estimates and Planning

Reconsideration of the findings of the 1937 probable effects study in the midwest dairy region in the light of recent experience is significant evidence that estimates of the future effects of certain planned changes can be made with a considerable degree of accuracy. The study referred to here was concerned only with probable effects of the Agricultural Conservation Program, but the procedure can be broadened to take into account the effects of other developments as well. For example, the same general approach can be used to estimate the effects that all technological developments in progress are likely to have on the agriculture of a region with the passage of time. Similarly, the procedure can be used to estimate the probable effects on the agriculture of a region of changes in prices of products. Information of the kind that would be provided by such analyses is needed in any study of interregional competition.[5]

The competition between regions in the production of any product usually makes itself felt by the influence which production changes in the various regions have on price. In evaluating the competitive supply positions of a region with respect to the products of one enterprise, such as dairying for example, the effects of either lower or higher prices resulting from either more or less production in other regions as well as the technological developments that affect production within the region need to be considered.

Individual farmers should benefit greatly from information that would become available by additional studies of the kind considered here for they would be provided with a better basis for formulating the expectations on which their production plans are based. Obviously, it would be impossible to forecast precisely in all cases the effects of the various factors that shape agricultural activity. However, it should be possible to reduce materially the divergence be-

[5] This general procedure in greater detail has been used in several area studies designed to show the competitive supply positions of competing regions in dairy production. For example see, R. H. Allen, E. Hole, and R. L. Mighell, Supply responses in milk production in Cabot-Marshfield Area, Vermont, Tech. Bul. 709, U.S.D.A. Also see, R. P. Christensen, and R. L. Mighell, Supply responses in milk production in Dodge and Barron Counties, Wis., Tech. Bul. 750, U.S.D.A.

tween that production performance on individual farms that is realized as a result of plans based on imperfect expectations and that which would be realized if farm plans can be based on well informed expectations.

The advance estimate method also appears to be the most satisfactory procedure for testing the probable effects of planned programs for agriculture for the purpose of learning whether the production adjustment desired can be expected to result from the program. But before such information is available some penetrating analyses must be made that will indicate what adjustments are desirable in the regional division of production. For example, in the case of dairying, we need to analyze the problem of how much dairy production will be required in the future in view of prospective demand conditions, and what regional division of dairy production is most desirable. Here the advance estimate method may be applied for the purpose of estimating where the production likely to be required in the future can be obtained at the least social cost. On the one hand, the method is useful in helping us to decide what plans and programs are needed in view of available resources and prospective demand conditions, and on the other, it is useful in estimating how successful proposed plans or programs are likely to be in achieving the desired effects on the agriculture of a region.

RECEIVED APRIL 7, 1941

NOTES

MR. BUNCE ON TIME PREFERENCE AND CONSERVATION

IN HIS article, Time Preference and Conservation[1] Mr. Bunce, in the August publication of this JOURNAL, takes issue with those who claim that certain public expenditures for conservation can be justified "primarily because society has a longer run interest than the individual."[2] If I interpret Mr. Bunce correctly, his objection to the point of view expressed by this quotation represents the nub about which his argument turns.

Apparently Mr. Bunce works primarily from two assumptions: first, that in the field of conservation the interests of the individual and the social interests coincide; and second, that the monetary measure is quite adequate to resolve problems in this same field. It is these foundations of his article which I wish to appraise. Mr. Bunce states:

> "In the case where exploitation is economic for the individual when all costs have been included it appears that it is also economic for society."[3]

This assumption of Mr. Bunce's is that very assumption which is basic to old neoclassical theory. It is rooted in the atomistic doctrine of Adam Smith, namely that the sum of the wealth of the individuals composing a society equals the social wealth.

Now the concept of social wealth as the sum of the wealth of individuals, totaling in a given society say "X dollars," means little because it neglects entirely the productive power of the physical factors of that society, and productive power regardless of price is important to any society. Furthermore, a society in which the "X dollars" are so distributed that 10 per cent of the people have $.9X$ dollars and the other 90 per cent have $.1X$ dollars has not the same "social wealth" as a society in which the same total "X dollars" are divided so more of the needs of more of the people can be met.

Even at the time Adam Smith's doctrine was first expressed there were some dissenters, but the Austrian school and many present day economists have accepted this assumption without question.

[1] Arthur C. Bunce, Time preference and conservation, JOUR. FARM ECON., May 1940, 22(3): 533–543.
[2] *Ibid.*, 533.
[3] *Ibid.*, 542.

As long as economists, using this doctrine, dealt with the problem of the individual business unit no serious difficulties were encountered. As long as there were apparently unlimited natural resources and unlimited economic opportunities within our capitalistic system there seemed to be little necessity for economists to deal with other than the problems of the individual. But faced with the difficulties our economy encountered during the last decade in restricted economic opportunities, more attention was directed to social problems.

Many economists have attacked the new problems using antiquated weapons, applying their theory in similar fashion to both the problems of the individual and to society as a whole. And, incidentally, one of the chief reasons for the continued application of these antiquated theories may be revealed when Mr. Bunce admits that one of his major objections to the concept of "Social Time Preference" is that "there is no basis for it in currently accepted economic doctrine."[4]

What the economists from Adam Smith through the neoclassical school failed to do and what many, so unfortunately, still fail to do is to distinguish between what may be called, for lack of better terms, economic and physical power. This failure causes them to work from a second erroneous assumption; namely, that everything is measured in terms of economic power, while the physical is hidden, wherever it exists, within the value concept. This second assumption, if not basic to, has at least helped to perpetuate the assumption, before mentioned, that individual and social economic welfare are identical.

The weakness of such an approach, that of classifying everything in terms of money values, is that it limits one to analyzing problems in terms of the individual's interest. Society's interest lies in the goods produced and distributed, and the services rendered; the individual's interest, in the income he acquires. So an individual in making a living in an interdependent society is primarily interested in economic power. Physical power for him is largely a means to an end. His unit of value is the dollar. He thinks in those terms. He usually doesn't consider the social implications of his efforts.

Society, especially a capitalistic society, also has an interest in economic power but for a different reason than the individual. Our system of free enterprise and private profit can not function effi-

[4] *Ibid.*, 534.

ciently unless economic power is widely distributed. This must occur before the physical resources of our economy can be effectively utilized.

When an individual spends money he no longer has it. However, the money, spent either by an individual or the government, is not lost to society. It has simply passed to the control of others and still exists as a power in society. It is true that the dollars might be used more effectively by one person than by another to direct physical power into productive channels. And a government when it represents society's interests must be concerned with the way the money directs the productive forces and the ownership of consumer goods. Do those who have economic power use it to direct the physical factors of the nation into productive fields? Or is the physical power of our society being wasted? If the latter is true, this is a loss to society. When large amounts of economic power remain idle, thereby failing to direct man power into productive channels as has happened to a marked degree in this country during the last ten years, it means a large social cost. And in this country we still have millions of idle men whose time has been and is being wasted since they are rendering no productive service to society. As long as there is work which they can do, be it in conservation or in some other field, it is a social cost if this work is not done.

I would agree with Mr. Bunce that the more important should come first and the more needed work in the field of conservation should be done before any other is attempted. I cannot agree with his means of determining when conservation is economic as set forth in this statement:

"Exploitation may be economic or uneconomic; it is economic when the cost of maintaining the fertility is greater than the value of the increment of resource used up. It is uneconomic when the cost of conservation is less than the value of the increment of resource used up."[5]

As long as labor is idle, society can well afford to direct it to the field of conservation even though as Mr. Bunce also suggests, the future generations may never need the resource so conserved. On the other hand, they may, and it is good social insurance to so act.

Nor can I agree with the mathematical marathon Mr. Bunce produces when he figures as follows:

"Let us assume a simple interest rate of three percent and the value of the copper or oil as one hundred dollars. Then in 100 years the value of the

[5] *Ibid.*, 536.

resources would have to be four hundred dollars in order to make it profitable for the individual to conserve it—thus holding the resources could deprive the future society of $400 of other production capital."[6]

I do not quote the above statement to discuss whether or not the copper or oil should be mined but to show again the difficulty Mr. Bunce encounters by including the physical within the value concept along with his mistaken identification of the economic interest of the individual and of society. It is nonsense to argue that holding this given physical resource of copper or oil now valued at one hundred dollars "could deprive future society of $400 of other productive capital." The copper or oil did not create the $100. It enabled an individual or corporation to get control over that $100 which might very well make it possible through interest from investment for the individual to later acquire a bigger share of the economic power. But to society that $100 has simply shifted hands. It is not $100 more economic power in society with a potential $400 value in one hundred years. It is the same $100 that was already in society and it remains unimpaired through changing hands. As mentioned before the dollars might be used better by one person than another to direct physical power into productive channels but that doesn't enter into Mr. Bunce's argument. He is so certain that this will be a "chaotic and irrational world" if he can't put everything on a dollar and cents basis, that he applies his mathematics where it not only has no meaning from the viewpoint of society but is false and misleading.

The limitations of neoclassical theory must be more generally recognized and the theory itself confined to the solution of those economic problems which fall within its scope—more notably those in the field of business and home or consumption economics. To apply neoclassical theory to the broad field of conservation is to misapply it.

R. E. MOODY

Wisconsin State Teachers College
RECEIVED APRIL 5, 1941

A REJOINDER TO MR. MOODY

THERE appears to be a new kind of witch hunting in process; the witch in this case is the application of economic theory to problems of social planning. This attitude is based upon one funda-

[6] *Ibid.*, 540.

mental misconception; it is that all "theory" applies only to the individual and anyone making use of theory is thinking only in terms of a laissez-faire competitive economy. This is nonsense. Social planning must use theory and it must be a theory that includes all kinds of social costs and benefits.

The results of this antagonism to "theory" is well revealed in Mr. Moody's note on my article and the basic misinterpretations he makes regarding my position. In the first place, he makes no contribution to the question of whether the concept of social time preference is of value or not; since he has no constructive remarks on its validity, he attacks the general procedure and proceeds to misinterpret very minor points in order to make a case for "social" economics. My article was not a discussion of social vs. individual economics. To be specific, Mr. Moody quotes my statement, "In the case where exploitation is economic for the individual when all costs have been included it appears that it is also economic for society." The above sentence is preceded in my article by the statement that, "Society is obviously justified in taking action to prevent uneconomic exploitation resulting from the fact that the individual does not bear the costs, or is motivated by custom, or when rigidity in the price structure and institutional factors prevent economic adjustments from taking place." Mr. Moody does not quote this, although it is in the same paragraph and is part of the total thought expressed.

Similarly Mr. Moody deliberately misinterprets my remarks on exploitation. I stated, "It is economic when the cost of maintaining the fertility is greater than the value of the resources used up." He applies to it the concept that the word "cost" includes only individual costs; my statement has both an individual and a social meaning and nowhere do I imply that social and individual costs are identical nor state that society should not use unemployed resources or base its actions solely on economic values (see p. 537).

Regarding my simple illustration on copper and its value in 100 years' time, I would point out that under social ownership[1] no transfer to an individual or corporation takes place and to bring in the issue of concentration of wealth is entirely irrelevant. The important thing is that Mr. Moody does not care to discuss whether the copper should be mined or not (although that is the basic topic) but states, "It is nonsense to argue that holding this given physical

[1] See p. 541 of original article.

resource of copper or oil now valued at one hundred dollars 'could deprive future society of $400 of other productive capital'." But if society mined the $100 of copper now and exchanged it for productive capital goods and annually added its marginal product for plant expansion, in 100 years society would own a physical plant valued at $400. If society did not mine the copper it would not have the plant. Mr. Moody apparently cannot understand this simple relationship and I am more than ever convinced that these anti-theorists do live in a "chaotic and irrational" world.

I suggest that Mr. Moody get rid of his preconception that all "theory" deals only with individual atomistic concepts because it not only leads to misinterpretations, but also makes it impossibel for theory to be used as a tool in social accounting. Modern theory is certainly not what Mr. Moody thinks it is. I refer Mr. Moody to my article Society and Conservation, in the June issue of Land Policy Review in which I discuss these issues in more detail.

A. C. BUNCE

Iowa State College
RECEIVED MAY 19, 1941

A REPLY

I NOTE that Mr. Bunce in his rejoinder has shifted somewhat from the stand held in his original article. This transformation is commendable since it strengthens the logic of his position. The change, however, is largely one of emphasis rather than of kind in which, if I interpret Mr. Bunce's rejoinder correctly, he has recognized some of the weakness of his earlier position. At any rate, his shift permits greater clarification of the argument.

For example, in his copper illustration Mr. Bunce now introduces this possibility:

"But if *society*[1] mined the $100 of copper now and exchanged it for productive capital goods and annually added its marginal product for plant expansion, in 100 years *society*[1] would own a physical plant valued at $400–."

Now this is an entirely different presentation of the copper problem than the one in Mr. Bunce's article. Nowhere in the original discussion did Mr. Bunce imply the possibility of social ownership. But this treatment of governmental operation classes it in the same category as an individual or a corporation engaged in acquisitive

[1] Italics mine.

endeavor. The individual entrepreneur is interested in prices, costs and profits. The governmental agency in its operations as a going concern also has an interest in this phase. It may make or lose money as determined by cost records just as may private enterprise. This, however, no more measures social loss or gain than it does in the case of the individual entrepreneur (Mr. Bunce's "theory" to the contrary notwithstanding). The governmental agency may make money as determined by cost records and there may still be a social loss, or the agency may lose money and there may be a social gain. To measure social loss or gain it is essential to break down these measures of human activity in order to separate the productive from the acquisitive phases.

For that matter, in all phases of conservation one must deal in terms of social losses and social gains. Mr. Bunce limits himself in his measure of social loss and gain to the monetary measure, dollars and cents. While the problem of conservation or of social losses and gains is partially tied up with acquisitive endeavor, and as a measure of acquisitive endeavor the monetary unit may be satisfactory, it is also pretty much limited to this field. Society's welfare, however, is limited also by its productive operations measured in terms of form, place and time (not ownership) utilities and this production can not be measured in terms of monetary units. A large supply of a certain product having an inelastic demand may have a lower total value than a smaller supply under similar circumstances. In other words, the monetary unit may give an inverse measure of productive effort.

Although Mr. Bunce apparently feels I have chosen minor statements to quote and criticize, my object has been to show Mr. Bunce's basic assumptions. It was these assumptions I attacked and attempted to show false as stated in my earlier note. Again, while complaining of my treatment of his explanation of exploitation Mr. Bunce also tries to shift position and claims " . . . no where do I (Mr. Bunce) imply that social and individual costs are identical. . . ."

But certainly Mr. Bunce from his use of the monetary unit throughout his original article believes it adequate to measure both individual and social costs. Even his qualifying statement which Mr. Bunce accuses me of intentionally omitting—

"Society is obviously justified in taking action to prevent uneconomic exploitation resulting from the fact that the individual does not bear the

costs,[2] or is motivated by custom, or when rigidity in the price structure and institutional factors prevent economic adjustments from taking place"

—simply reveals again his dollars and cents economics which he applies to both the individual and the social. Although Mr. Bunce bases his argument on this type of economic theory, it might be noted here that in the first paragraph of his rejoinder he pays lip service to "all kinds of social costs and benefits."

In his rejoinder Mr. Bunce also states—"Mr. Moody deliberately misinterprets my remarks on exploitation." I requote Mr. Bunce's remarks:

"Exploitation may be economic or uneconomic; it is economic when the cost of maintaining the fertility is greater than the value of the increment of resource used up."

I take the liberty of interpreting the above remarks with an example:

A given farm valued at say $100 per acre, as operated is subject to erosion so that the annual loss in value is $5 per acre. The annual cost of maintaining its fertility would be $6 per acre. To Mr. Bunce, exploitation in this case would be economic. As concerns the individual, who is interested in profits, I would agree. As concerns society, which has other interests, I would repeat—"As long as labor is idle, society can well afford to direct it to the field of conservation even though as Mr. Bunce also suggests, the future generations may never need the resource so conserved. On the other hand, they may, and it is good social insurance to so act," and I would add that viewed socially under these conditions exploitation is always *uneconomic* (not economic as determined by Mr. Bunce's "theory").

To picture the outcome of public policy based upon Mr. Bunce's theory is not encouraging although future generations, gazing upon their meager heritage, might console themselves with the thought that, after all, the exploitation of natural resources practiced by their forbears was justifiable because it was "economic."

R. E. MOODY

Wisconsin State Teachers College

RECEIVED JUNE 23, 1941

[2] Italics mine.

AN INVESTIGATION ON COMPLIMENTARITY RELATIONS BETWEEN FRESH FRUITS: A REPLY*

THE increasing interest in the relation between the demands for commodities leads frequently to an uncritical application of methods which have been developed for the analysis. The analysis by Sidney Hoos is an example of this.[1]

This critic intends to point out (1) the inadequacy of the rough test for interrelated demand by Henry Schultz, and (2) the insignificance of the results obtained by Hoos.

(1) The "rough test" has been taken over by Hoos from Henry Schultz. This rough test should be abolished because it is based on an erroneous assumption made by Schultz. The implicit assumption is that for independent commodities the variations in the quantity ratios are of the same relative size as the variations of the price ratios. This, however, does not hold. The variations of the ratios depend also upon the elasticity of demand. The more elastic is the demand for either commodity, the greater is the variation of the quantity ratio as compared with the variation of the price ratio.[2]

Schultz's rough test could be used without modifications only if there were any reason to assume that the elasticity of demand is

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* Journal Paper No. J-380 of the Iowa Agricultural Experiment Station, Ames, Iowa. Project No. 383. The author acknowledges the helpful criticism of his colleague Gerhard Tintner.

[1] Sidney Hoos, An investigation on complementarity relations between fresh fruits, JOUR. FARM ECON., May 1941, 23: 421–433.

[2] This can be shown readily for logarithmic demand curves assuming that the elasticity of demand η for both commodities is the same. In this case the relation between the relative variation of the quantity ratio to the relative variation of the price ratio is

$$\frac{d \log (c_1/c_2)}{d \log (p_1/p_2)},$$

if the commodities are independent. The demand functions for both commodites are $\log c_1 = a_1 - \eta \cdot \log p_1$ and $\log c_2 = a_2 - \eta \cdot \log p_2$. The above relation can also be written

$$\frac{d \log (c_1/c_2)}{d \log (p_1/p_2)} = \frac{d(\log c_1 - \log c_2)}{d \log (p_1/p_2)} = \frac{d[a_1 - \eta \log p_1 - a_2 + \eta \log p_2]}{d \log (p_1/p_2)}$$

$$= \frac{d[a_1 - a_2 - \eta \log (p_1/p_2)]}{d \log (p_1/p_2)} = -\eta.$$

The problem is duscussed in detail in a bulletin by the author which is being published. Research Handbook for Interrelated Demand. Illustrated by the interrelated demand for edible fats in the United States 1923–1939, Res. Bul. (In press). 1941, Agr. Exp. Sta., Iowa State College, Ames.

usually $\eta=1$. Since this assumption is not legitimate, Schultz's rough test is not legitimate either and should not be used.

(2) The results of tests have to be examined as to their significance. For this the standard error is used. If the results of the tests are found to be insignificant one should state it and not try to uphold that they are significant.

The t-test[3] for the sign applied to the results of Hoos gives the following results for the Hotelling condition on p. 425:

Values of t for the Hotelling condition

Pears and plums	0.708	3.73
Pears and peaches	0.008	1.80
Pears and oranges	0.954	0.80

There are 10 degrees of freedom left for which the values of the t table show: $t_{50}=0.700$, $t_{20}=1.372$, $t_{10}=1.812$, $t_{05}=2.228$, and $t_{01}=3.169$.

In four cases out of six t is smaller than one, in one case t is smaller than t_{10} and in one case only it is larger than t_{01} so that the result is highly significant. Even in that case the test is significant only with respect to one side, not with respect to the other.

The standard errors for the Slutsky condition on p. 427 have been computed as follows:[4]

Values of t for the Slutsky condition

Pears and plums	1.104[5]	0.280
Pears and peaches	0.413	1.340
Pears and oranges	0.265	0.222

The values of t for various significance levels are the same as for the Hotelling test. In four out of six cases t is smaller than one, in the other two cases it is smaller than t_{20}. The results are, therefore, altogether insignificant.[6]

The small income effect for the Slutsky condition on p. 427 compared with the substitution effect shows once more that the refinement of the Hotelling test by introducing the income effect is of

[3] See R. A. Fisher, Statistical methods for research workers, Third Edition, 1930, pp. 104 ff. The values of the standard deviations given in the article have been used.

[4] It is the square root of the sums of the variance of the total effect and of the income effect, if independence between total effect and income effect is assumed.

[5] On p. 427 the figure for the Slutsky condition is correctly −0.4410 instead of −0.04107.

[6] Hoos omitted any test of significance for the Slutsky condition.

no use. The standard error of the total Hotelling effect exceeds the income effect by between 10 and 100 times.

Hoos mentioned that the conclusions may be statistically invalid. He maintains, however, that "the conventional interpretation of standard errors computed from time series data is of doubtful validity. Since the 'rough test' and the Hotelling condition test yield fairly similar results, there are some grounds for concluding that pears do not compete with oranges in consumption but do compete with plums and peaches."

This statement involves two fallacies: (1) There is no more doubt about the validity of standard errors than about the validity of correlations in time series. One can not use time series for correlation and deny the validity of the standard error. Besides, there is no doubt that the standard error in time series is at least as great as the statistical standard error, the problem is only whether it is not greater. Statistical results from time series are never more reliable than is indicated by their standard error; they are, however, frequently less reliable. (2) The "rough test" and the "Hotelling test" must yield similar results since they are based upon the same sample. The similarity of their results never can confirm the results, since the one is supposed to be a short cut for the other.

The tests by Hoos did not show more than that the market data are compatible with the assumption, that pears are competing with plums and with peaches, but not with oranges. The test did not refute this hypothesis, and also it did not confirm it. The test just showed that no definite relationship between the fruits can be concluded from the data.

All the reasoning of the analysis by Hoos is, therefore, not confirmed by the test from the market data, but just based on general reasoning as commonly used by fruit wholesalers. The test shows that the market data do not support the assumption that there is a very strong interrelationship between the demands for the four kinds of fruit.

ADOLF KOZLIK

Iowa State College
RECEIVED JUNE 10, 1941

LAND CLASSIFICATION, LAND-USE AREAS, AND FARM MANAGEMENT RESEARCH

THE PAST decade witnessed a remarkable growth in the inventory and classification of land. Unusual interest in the intensified problems of agricultural adjustment made necessary the delineation of homogeneous land areas for which national policies in regard to land use might be determined. In regard to furnishing broad area information, generalized land classification has been rather easily accomplished.

It was soon recognized, however, that the actual administration of action programs based on broad area policies required specific analysis of land resources within small areas, such as counties and local political subdivisions. Research workers soon realized that a useful land classification to guide such local administration of agricultural programs was extremely difficult to establish. The object of this paper is to describe such difficulties of local land classification apparent in certain research work in Louisiana.

Fundamentally, the difficulty of land classification in an economic sense is that a single classification has usually attempted to delineate the whole complex of production capabilities, location factors, established land use, and the effect of vested interests in property or institutions. These different variables are obviously too numerous to be combined into one useful set of land classes by any reasonable objective method. For example, within the limits of modern soil science, land can be readily classified as to productivity for various crops. Only one variable is used here, but as variables are added including location, topography, economic shifts in demand and markets, and various institutional factors influencing land use, an arbitrary procedure can scarcely be utilized to allocate proper weight to each variable. On the other hand, a land classification confined to one or two objective physical factors is not an economic classification useful in agricultural problems. Physical properties of an area may or may not determine land use when related to economic factors.

Under such conditions, local land classifications are perhaps better based on experienced opinion influenced subjectively by the most important objective variables, but not incorporating specific "scientific" or "objective" methods in combining the numerous variables. Such procedure can be used to delineate local areas for

administrative purposes, within which objective analysis of specific variables, such as soil, topography, or accessibility to market, can be used to determine the local application of agricultural programs. Local land classification on this subjective basis may proceed in one of two ways. Trained observers may acquaint themselves with the area, and by the exercise of experienced and impartial judgment determine land areas with homogeneous economic conditions. On the other hand, such classification can be made by local residents intimately acquainted with the area, whose verdict might be assumed to be superior to that of a person with less intimate knowledge.

Land Classification in Lincoln Parish

The first method, observation by an impartial trained observer, has found its principal use in the New York land classifications made by the Department of Agricultural Economics at Cornell University. The judgment of these observers is guided principally by the evidences of farm success reflected in the farm buildings and in the general farm establishment, and by notations concerning land use in the area. The second method, classification by local residents, is being utilized by the United States Department of Agriculture in the current land-use planning program. Committees of local farmers meet in each community to map the area according to their concepts of desirable present and future land uses.

In Lincoln Parish, an upland cotton area of north Louisiana, both types of classification have been made. The BAE and the FCA cooperated in a land classification study in 1938, in which an agricultural economist and an appraiser trained in agronomy studied the parish and made a land classification based on general observations concerning farm success and land use. Later, in 1939, a land-use map was prepared by local farmer committees cooperating in the federal land-use planning program. Also, in 1939, a farm management study of 507 farms scattered throughout the parish was made by the Department of Agricultural Economics of Louisiana State University.

The general outlines of the farmers' land-use map and the land classification map of the two agricultural workers are highly similar in the delineation of broad areas. The specific objectives of these two area classifications were not altogether similar. However, both presented a final grouping of areas based on economic analysis. As such, they should be useful to students in agricultural administra-

tion and agricultural research, particularly in basing studies involving farm management analysis. This paper analyzes the usefulness of these two classifications in relation to research and administrative possibilities, disregarding other broad values which the classifications may have.

The study made by the two observers mapped all rural land in four classes designated by numbers according to the intensity of use. Land class I included areas where the land had not been taken into agricultural use except in isolated instances, and drainage difficulties or poor soils indicated little present or future adaptability for crop use. Land class II represented the least intensively used of the agricultural areas, where abandoned crop acreage and poor farms indicated that past farming had been unsuccessful. Land in class III was judged to be average upland farm land that should remain permanently in agriculture. This class was divided into low III and high III according to increasing intensity of use. Land class IV represented better than average farm land in intensive agricultural use, and included only two small tracts in the parish.

These land classes, it will be remembered, were determined by observation. The usual objective data were considered in relation to the indications of success in past farming experience, with no definite weights given to any single factor. Thus, a land class was established not only on the basis of soils, location, and intensity of use, but on the opinion of the observers, which was naturally influenced by the effect of any one or several of these factors on the present and prospective land use.

The farm management data on farms in each of these land classes later furnished a check which showed clearly the validity of the classification. Although only one farm was studied in land class I, and only 3 in land class IV, a sufficiently large sample was taken in each of the other three areas to produce a reliable area average.

The accuracy of the classification according to the intensity of use was shown by a steady progression in acres of cotton per farm from 15 in land class I and 16 in II, to 25 in high III and to 90 in IV. Average investments in farm property rose from $2,700 in II to $5,000 in high III and to more than $16,000 in IV. The productivity of farms in the various land classes, measured in pounds of lint cotton per acre, was as clearly demonstrated, rising from 211 pounds in II to 257 in high III and to 370 pounds in IV.

Practically every farm management factor reflecting intensity of

land use varied in similar correspondence to land class. Total receipts rose from $565 in II to $1,103 in high III and to $4,465 in IV, and total expenses per farm rose in the same fashion. Farm income (total farm receipts less total farm expenses) was −$17 for the single farm in I, and increased to $38, $76, $114, and $1,544 for farms in each of the respective higher land classes. If 5 per cent interest on the average investment is deducted as an expense, however, this earnings record tends to reverse itself. Interest expense is always high in the better land areas with large investments per farm. This bears out the usual farm management principle that, in unfavorable years when prices are low, good farms with large capital investments lose more money than poor farms, if the heavy overhead costs are considered.

In this connection, it is interesting to note that when interest on capital is deducted and the value of farm privileges is added, the average labor earnings on farms in land classes II, low III, and high III showed few significant differences. However, the superiority of land class IV was still evident. Unusually high labor earnings per farm were obtained in class IV, since cotton yields were more than 100 pounds per acre above any other area.

One of the principal factors used to indicate farm success in this study was the quality of the farm buildings, which was noted for each rural residence in the parish. As a general rule, land classes I and II had the greatest proportion of poor farm buildings. The farm management study indicated that the intensity and capabilities of land areas in Lincoln Parish could rather definitely be ascertained from this factor. Farms with poor dwellings had the fewest acres in crops and in cotton, the lowest cotton yields per acre, the least farm capital, and the lowest receipts and expenses per farm. The average for each one of these factors increased steadily as the buildings were classified poor, poor to fair, fair to good, and good to excellent.

This evidence demonstrates clearly that trained observers can produce a useful local land classification simply by making a thorough inspection of an area and noting the characteristics of farm operation and land use. Such a classification can delineate local areas where the economic problems of land use are sufficiently homogeneous to permit administrative decisions concerning local procedures. Within these areas, specific applications of procedures should be guided by classifications of single variables, such as farm management data and soil surveys.

One limitation of all detailed land use classifications is the difficulty of utilizing them in areas where settlement has never been established. The method just described depends wholly on the record of past experiences in farming the various areas. Where the "trial and error" method of determining land use has not proceeded uniformly throughout an agricultural area, it is practically impossible to determine homogeneous land classes by these methods. However, most difficulties in the study of agricultural problems are confined to areas in which farm experience has already accumulated a useful record of land capabilities, such as the record of cotton farming in Lincoln Parish.

The Land-Use Planning Program

Cooperating in the land-use planning program of the United States Department of Agriculture, the Extension Division of Louisiana State University held meetings in 1939 at the local community centers in Lincoln Parish for the purpose of determining land areas requiring similar agricultural adjustments. All farm land had previously been drawn on the map, and the farmers were asked to classify general areas of all land and to make recommendations concerning needed adjustments. The farm management data again were used to check the areas delineated by this means.

Although 12 separate areas were delineated in the parish by the farmers, sufficient farms to warrant any generalizations concerning the findings were studied in only six of the land classes. In two of these areas, the farmers recommended that the land now in farms was fair to good, and that the farms needed only minor adjustments. In two other areas it was recommended that the farms should be larger and the operations more extensive, and in the remaining two areas that the land in farms should be returned to other uses because it was not suited for farming. In general, the spirit of these recommendations corresponded to the previous classification of land classes I, II, and low III.

The land class in which the farms needed only minor adjustments appeared to be fairly well delineated, since the farm management study showed that acres in cotton, farm capital, cotton yields, receipts and expenses, and farm incomes all were high as compared to the average for the parish. The remaining four areas studied, however, did not appear to be well delineated from the farm management point of view. Eight farms in one of the two areas in which it was recommended that the land be retired from crop use, equaled

the parish average with a farm capital of $3,000, while cotton yields of 253 pounds per acre were higher than in any other area, and farm income of $119 was substantially above the farm income in the area where farms needed only minor adjustments. Even though these farms might not be typical of the area, they do indicate that the areas included numerous farms not accounted for in the classification.

In addition, one of the two areas in which the farmers recommended larger farms already had the largest farms of any area studied. In both of these areas, farm incomes were again somewhat larger than in the two areas where farms needed only minor adjustments. In regard to labor earnings, there was little significant difference between most of the areas, except that they were substantially greater in one of the areas recommended for retirement to forestry.

Considering the fact that the farmers' land-use map delineated 12 areas instead of the five areas of the previous land classification, it is not altogether surprising that the farm management data in each area show less constant tendencies. Samples were smaller in analyzing the farmers' land-use classes, and even then the data in several cases supported clearly the recommendations of the farmers. Nevertheless, considering all factors, it appeared from the farm management data that the observers' land classification was definitely more successful in delineating homogeneous land areas of the parish than was the farmers' land-use classification.

Comparisons Within Areas

Additional and more interesting comparisons between the two types of land classification can be made in specific areas where the land classes differed. Three hundred and ninety-eight farms were studied in one large class delineated by the farmers as good farm land needing only minor adjustments. The previous land classification had mapped land class II, low III, high III, and IV within this large general area. The farm management study showed substantial differences between these various land classes within the area termed uniform by the farmers. For example, acres in cotton and yields per acre increased consistently with the higher land classes determined by the observers, as did receipts, expenses, and farm income. Cotton yields within the area considered uniform by the farmers ranged from 208 pounds of lint in land class II steadily

upward to 370 pounds in land class IV, farm incomes varied from $135 to $821 between the same classes, and the scale of the farm business increased similarly. Apparently, the farmers' land-use map, although delineating 12 types of areas instead of 5, failed in some cases to make as fine distinctions as did the observers' classification.

The conclusions that may be drawn from this analysis of the data appear quite definite. First, the farm management study indicates that the land classification prepared by the trained observers was more successful than the farmers' land-use map in delineating general areas within Lincoln Parish where economic characteristics such as land uses, cotton acreages and yields, farm investments, and farm incomes were relatively homogeneous. Second, the fact that there were significant differences between the various land classes within the supposedly uniform farmers' land-use areas, and that there were few substantial differences between the various land-use classifications within the observers' land classes, indicates that the land class map was superior even in local details to the farmers' land-use map.

General Conclusions

The foregoing data point out certain facts relevant to agricultural policy, to the administration of agricultural programs, and to research in agricultural economics. It has already been contended that land classification in local areas can scarcely proceed by a rigid evaluation of objective factors, because of the extreme difficulty of allocating the proper importance to each of the numerous variables. When local land classifications are desired, they are perhaps best obtained by the more subjective evaluation of individuals who are trained to relate all the variables in a manner that statistical devices do not permit.

Delineation of local land-use areas within each county or parish is particularly valuable in guiding research work in agricultural economics. Too often expensive farm management studies are made with almost complete disregard for all statistical sampling techniques, apparently on the theory that a satisfactory sample is secured from a political subdivision. Recommendations for individual farm adjustments, however, can be useful only when they are made with due consideration for the local land-use area in which a farm is located. Farms selected from each of a few land-use areas with

relatively uniform economic capabilities provide a basis for much more useful work than has frequently resulted from farm management projects.

Another specific use of local land classifications is afforded by the experience of the FCA. In Lincoln Parish, the number of delinquencies and losses on loans were highest in the low land classes. The entire record of loan experience was directly related to the differences between land classes as determined by the two observers. Obviously, a local area classification based on past experience in farming is valuable to agencies engaged in credit activities, particularly when main offices are at a considerable distance from the local area in which an appraiser is working.

If rapid and reasonably accurate local land classification is needed by research workers, areas can be delineated most efficiently by a relatively few capable workers. The present voluminous production of farmers' land-use maps is not likely to be of much aid in future research work, judging by the results of the Lincoln Parish analysis. The principal value of the county land-use planning maps is obviously educational. Farmers, when meeting in communities to classify their area and to make recommendations concerning land use, must study and analyze their problems. The value of their classifications in basing research and in determining the local administration of agricultural programs, however, appears definitely limited by elements of bias, provincialism, and lack of interest. If the classifications are used, a subjective reconnaissance is essential in order to check the entire area and draw the groups together on a consistent basis.

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WHEAT YIELD INSURANCE

WHEAT YIELD insurance, a program sponsored by the Government for promoting stability in income to wheat farmers, is embarking upon its fourth year of operation. Through the actuarial treatment of wheat yield experience, it is believed that uncertainties in yield expectations can be reduced to risks which can be borne by the farmer through the payment of annual premiums in grain to assure a crop of a given size. Such a stabilization of quantity of product for sale each year would contribute toward

stabilizing the incomes of wheat farmers; especially those in the Great Plains area where the majority of the nation's wheat crop is produced and weather hazards present serious limitations to crop production.

It is the purpose of this note to direct attention toward several aspects of the program which seem to deserve critical consideration. The discussion will be limited primarily to the wheat yield insurance program as it affects wheat farmers in Kansas, where rainfall is the decisive factor in the production of wheat. The conclusions, however, are believed to apply in other areas of the Great Plains wheat belt.

(1) The program as it now operates fosters irrationality of resource allocation. If a farmer insures each year, he must likewise plant the same acreage to wheat each year regardless of crop prospects in order to balance premiums paid in wheat with indemnities received. The premiums are calculated to support each farm's individual risk evaluated during a base period and conditioned somewhat by the yield experience of the territory surrounding the farm. Each farmer, therefore, is expected to pay sufficient premiums to support indemnities incurring to him throughout a series of years operation. If premiums were paid on large acreages in years of good prospects and indemnities were received on low acreages during years of poor prospects at seeding time, it can be seen readily that premiums would exceed indemnities over a period of years.

The importance of the point made in the foregoing paragraph rests largely upon the accuracy of wheat yield expectations at seeding time. The closing date of insuring for the 1941 winter wheat crop was set at August 31, 1940. According to several investigations, a fairly reliable judgment relative to the chance of wheat failure from lack of moisture can be formed at this date. Moisture is the predominant factor influencing wheat yields in the Plains States. It has been shown[1,2] that the amount or depth of soil moisture at seeding time is a useful criterion for evaluating winter wheat yield prospects. Henney[3] has found that the amount of rainfall during the spring and summer prior to seeding is an important

[1] A. L. Hallsted, and E. H. Coles, A preliminary report of the relation between yield of winter wheat and moisture in the soil at seeding time. Jour. Agr. Res., 41. 6: 467. 1930.

[2] A. L. Halsted and A. R. Mathews, Soil moisture and winter wheat with suggestions on abandonment. Kans. Agr. Exp. Sta. Bul. 273, 1936.

[3] Homer J. Henney, Forecasting the yield of winter wheat seven months prior to harvest. JOUR. FARM ECON., 14, (2): 1932.

factor in determining the yield of winter wheat. It seems, therefore, that wheat farmers can roughly evaluate crop prospects at seeding time when planning the year's seeding operations. Such foresight and judgment are quite valuable in conducting a successful wheat farming enterprise in the Plains States.

If, in order to achieve maximum gains from his insurance program, the farmer plants the same amount or more acres of wheat in years when the crop appears destined to fail as in years of good prospects, a waste of resources would obviously occur. In the interest of promoting more rational allocation of wheat farmers' resources, effort could be well spent in assisting the farmer to form a reliable judgment at seeding time regarding the likelihood of wheat failure. If soil moisture conditions or some other criteria at seeding time indicate that failure is almost inevitable, it would be more sensible to restrict seeding operations for the year and summer fallow to strengthen prospects for a following year, rather than waste resources on seeding the usual or a larger acreage merely to collect insurance indemnities.

(2) The wheat yield insurance program permits a farmer each year to insure or not as he chooses. With such an option, farmers can take an inventory of moisture conditions at seeding time and roughly appraise the likelihood of failure. If the crop is insured mostly in years when unfavorable prospects prevail, the insurance program would be rendered much less amenable to the actuarial methods used. With premiums calculated as they are, according to the yield experience during a designated base period, indemnities might exceed premiums because of the selection of only the years of poorer prospects for insuring. It is recognized that this problem would not be very important in areas in which less predictable hazards such as frost are likely to occur. However, as the majority of the United States wheat crop is produced in the Plains States where the likelihood of failure from the most limiting factor (moisture supply) can be partially calculated at seeding time, the ability of one to select unfavorable years does create an actuarial problem of importance. This problem could be alleviated by requiring the farmer to take out his insurance contract a year in advance. If insurance for a specified acreage is taken out a year in advance of seeding, however, the farmer would be less flexible to adjust seeding and resource allocation according to prospects prevailing at seeding time.

(3) The costs of administering the insurance program are borne entirely by society through a separate appropriation provided each year by Congress. The premiums paid by farmers are to supply sufficient grain to support indemnities in years of low crops. The funds supplied by society to the program are, therefore, spent toward providing the machinery whereby the farmer can store a certain amount of wheat each year to assure an amount for sale in following years regardless of natural hazards which might affect the yield.

During the first year of operation, the 1939 crop season, the costs of administration were necessarily quite high because of extra actuarial and administrative work involved in the inauguration of the program. During this year, 165,777 farms were insured with administrative costs of $26.44 per contract. In 1940, these costs were reduced to $15.14 per contract through increased participation and economy of operation. Much of the field work was conducted through the county offices of the AAA. The average premium paid per contract was 37 bushels in 1940. In North Dakota and Kansas premiums averaged 63 and 61 bushels, respectively, per contract, while in Ohio the average premium paid for each completed contract was 11 bushels.[4]

The wheat yield insurance program does not propose to contribute to the economic relief of wheat farmers through direct transfer of social funds to the farmer. The funds furnished by society are to assist the wheat farmer in insuring his risk from natural hazards and to provide for the storage of grain for sale in years of poor crops. In the final analysis after risks are insured, the yield insurance program is in reality a storage program. We should therefore carefully appraise the returns from the $15.14 that society is spending to store 37 bushels of a farmer's wheat crop each year to provide a reserve for sale in years of failure or small crops. The cost of storing wheat premiums handled by the wheat yield insurance program is approximately six cents per bushel per year, or $2.22 per year for the average premium, 37 bushels. After subtracting the $2.22 storage costs from the total costs of $15.14, there remains $12.92 of the total cost of operation per farmer which is used for purposes other than storage.

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[4] The second annual report of the manager of the Federal Crop Insurance Corporation. 1940.

CORRELATION ANALYSIS OF FARM LAND VALUES

THE WORK of the Land Economics Research Section of the Illinois State Planning Commission for some time has concerned itself with the application of multiple correlation procedure to the problem of farm real estate values in Illinois. The application of correlation technique to problems of this kind is not without precedent. As early as 1922, Haas[1] conducted an investigation of factors related to land values on 160 farms in Blue Earth county, Minnesota. Per acre sales prices were selected as the dependent series. Used as independent variables were depreciated value of farm buildings, land classification index, crop index, and distance from town. In Haas' words "the assessed valuations of the 160 farms covered in the survey have the amazing probable error of 26.7 per cent of the average sale value, or $33 per acre, compared with the probable error of 9.55 per cent of the average sale value, or $15 per acre, in the results obtained in this survey." Quite comprehensive in scope, Haas' study has the distinction of being a pioneering piece of work in this particular phase of land economics.

Subsequently, Ezekiel[2] (1926) of the Federal Bureau of Agricultural Economics applied multiple curvilinear analysis to the elucidation of land values on 368 dairy farms in Chester county, Pennsylvania. This was primarily a farm management study, major emphasis being placed upon the relative contributions of various factors to farm values in this area. Of the variables included, farm buildings were responsible for 44 per cent of the variations in farm value; the land, including fertility, topography, and proportion usable, 13.5 per cent; and general farm factors of location and type of road, 2.5 per cent. The contribution of the farm dwelling to the farm value was found to be a joint function of the value of the dwelling and of the size of the farm.

Wallace[3] (1926) in Iowa made a study of farm land values in the 99 counties of the State. This study was based upon the 1925 federal farm census of agriculture for Iowa. In this instance the per acre market value of farm land alone was used as the dependent variable. Constituting the independent variables were (A) 10 year

[1] G. C. Haas, Sales prices as a basis for farm land appraisal, Minn. Agr. Exp. Sta. Tech. 1922. Bul. 9.

[2] Mordecai Ezekiel, Factors affecting farmers' earnings in southeastern Pennsylvania, 1926. U.S.D.A. Dept. Bul. 1400.

[3] Henry Wallace, Comparative farm-land values in Iowa. Jour. Land and Public Utility. Oct. 1926. 2(4).

average (1914–23) corn yield in bushels per acre, (B) percentage of farm land in corn, (C) percentage of farm land in small grain, and (D) percentage of farm land not plowable. Wallace succeeded in bringing about a reduction in the average variability to the extent of 50 per cent.

The work of the present writer (1939), treating of Illinois as a whole, has as its objective the derivation of a regression equation which will serve as an estimating instrument in the prediction of the per acre value of farm real estate in the various counties of the state. The investigation consists essentially of a thoroughgoing statistical analysis of the relationships and interrelationships, existing between the per acre capitalized "net" rent value of farm real estate and a series of independent variables. The associated independent variables include (A) gross income per acre of crop land, (B) average size of farms in acres, (C) percentage of total farm income represented by the value of products consumed in the home, (D) percentage of farm land in harvested crops, and (E) percentage of farm tenancy.

Based upon the 1930 farm census for Illinois the present study is more recent than many of the contributions, resulting from earlier research of similar nature. The analysis gives emphasis to geographic differences in the value of farm real estate in Illinois. So far as we are aware this is the first time that per acre capitalized "net" rent has been used as a criterion of actual value. If earning power or potential earning power of the farm property be accepted as the determinant of value we believe we have been fortunate in the choice of our independent variable.

We anticipate some objection to our use of (E) percentage of farm tenancy, as an independent factor. Considered logically its economic relation to the value of farm real estate proves to be dependent, rather than independent. Analysis of the problem from the standpoint of conditions under which the regression obtained would approximate functional (causal) relationships may be desirable. However, this gets us into some difficult questions concerning which we have neither generally accepted procedures nor agreement among economic statisticians as to the usefulness of the attempt.

In the calculation of the standard error of estimate the residuals have been corrected for the influence of the particular farming-type area in which the county happens to be situated. Farming-type

TABLE 1. SUMMARY OF PERTINENT ITEMS, MULTIPLE CORRELATION PROCEDURE APPLIED TO THE ESTIMATION OF PER ACRE FARM REAL ESTATE VALUES, FOUR INVESTIGATIONS

1. Investigator	G. C. Haas	H. A. Wallace	M. Ezekiel	J. P. George
2. Geographic location	Blue Earth City, Minnesota	State of Iowa	Chester City, Pennsylvania	State of Illinois
3. Year reported	1922	1926†	1926‡	1939§
4. Number of observations	160	99	368	98**
5. Dependent variable	Per acre sales price	Per acre market value of land alone	Per acre market value without dwelling	Per acre capitalized "net" rent
6. Number of independent variables	4	4	8	5
7. Multiple correlation coefficient	R 0.81	R 0.9166	P 0.772	R 0.9357
8. Accounted for variance in percent	65.6	84.0	59.6	87.5
9. Mean of farm real estate value series	$157.23	$118.32	$86.75	$70.88
10. Standard deviation of farm real estate value series		27.05		33.32
11. Standard error of estimate	22.24*	10.83		12.48
12. Reduction in average variability		50.00		62.50

* Standard error of the Mean.
† Based upon the 1925 federal farm census of agriculture for Iowa. Production items as of crop year 1924.
‡ Survey for the year April 1, 1922 to March 31, 1923.
§ Based upon the 1930 federal farm census of agriculture for Illinois. Production items as of the crop year, 1929.
** Counties of Cook, Du Page, Lake, and Moultrie omitted.

area is a non-quantitative independent factor of considerable significance in its association with farm real estate values in the various counties.

The investigation discussed in the foregoing paragraphs is to be regarded strictly as a preliminary study for purposes of exploration of the possibilities inherent in this type of research. Work is now in progress, approaching the problem on a farming-type area basis, using 1935 soil survey information, and farm census data by minor civil divisions (townships and precincts). This enables us to reduce the size of the unit and to increase the number of observations in any given series. From the standpoint of sampling this is desirable. Furthermore, regression equations, by farming-type areas, derived through the use of township data, reflect localized conditions much more specifically than is practicable through the application of a generalized equation for the state as a whole.

Finally, developments in statistical methodology within the past few years have been rapid and in some respects revolutionary. In our work we have been fortunate in having at our disposal tools which are much more refined than was the case with our predecessors of a decade or two ago. We refer to the contributions of R. A. Fisher and his associates of England, notably, the analysis of variance and of covariance and of tests for statistical significance or reliability. Properly utilized these advances in statistical technique should result in a degree of precision formerly difficult of attainment.

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Illinois State Planning Commission
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REVIEWS

Technology on the Farm: A Special Report by an Interbureau Committee and the Bureau of Agricultural Economics, U. S. D. A. August, 1940. Pp. 224+xiii. Ill. with bibl. Superintendent of Documents, $.40.

This study presents an analysis of technological change with special reference to agriculture. It is evidently written primarily for farmers but it also presents analyses of technological events of "outstanding importance" to a more general audience. By means of a division of the study into two major parts, "Meanings" (Part I), and "Surveys" (Part II), the committee has succeeded in giving both a general survey of the import of technology and statements upon particular aspects (plant breeding, artificial insemination, fertilizers, etc.) giving technical information in a popular form.

In the very nature of the case it is a sketchy survey, not a complete authoritative report. Not only is the field so vast that selection and emphasis are necessary, but also events are moving so rapidly as to defy all attempts at categorical statement. Furthermore, as individual scientists we work at the problem by fragments making a committee approach to the whole virtually necessary; as a consequence the report suffers somewhat from the lack of a comprehensive point of view which integrates all aspects into a whole.

What is technology? It is "science, art, and invention." In fact, it includes virtually everything that is happening to us from research on vitamin B to war. Since these events are all about us, one reads this statement with a general sense of familiarity, even though there is an encyclopedic presentation in the surveys of unfamiliar technical details. Yet a full reading of the monograph almost leaves one in a state of breathless expectancy. Surely the industrial revolution is catching the farmers up into a faster tempo of change. Too, the scientific research of our colleagues in the experiment stations and the Department, as well as others, is presenting farmers with a new order of practices out of which to build a going farm organization. Yet it is nowhere suggested that American agriculture will be transformed overnight.

American farmers have a long history of accepting innovations, and voluntarily. For them, this is another and a special outlook report. The evidence is marshalled to present the basic issues as

they affect the organization and operation of the individual farm; size of farm, cash costs, fixed and variable costs, etc. Even though these great technical developments may be analyzed as trends, or referred to as forces, sight is not lost of the fact that farmers do have some choice in the matter, and that the standards by which those individual choices may be guided must be relevant to pecuniary considerations in a money economy. Farmers are warned, in effect, that the integration of technological innovations into their farm organization may so change the structure of costs and income that they face severe financial strains during periods of depression.

Although technological changes are introduced into agriculture by the acts of individual farmers, the cumulative effects of all individual choices combine to create social problems. The report attempts to estimate the probable major changes over the decade 1940–1950. It is anticipated: that tractors will increase by at least a half-million; that as many workers will be displaced; although there are no prospective mechanical developments likely to affect labor requirements as drastically as the mechanization of wheat production in the 1920's (p. 63); that livestock and crop improvements will continue so that 10 per cent more livestock may be available with an estimated 7 per cent increase in population during the decade of the 1940's (p. 47). The list of anticipated technical changes is long: all point in the direction of producing more or better food and fibre with less effort.

But beyond the questions of the prospective technological changes, the impacts on farm organization, and the cumulative changes in production, there arise the problems of the impact on rural people, on social organization and the questions of what we are going to do about them. The attempt to deal with all phases of this complex problem leads the authors to touch on most of the pressing social questions of our times. In so doing many of the fundamental issues in social thought are implied in the problem. Two or three of these seem to the reviewer to deserve special comment.

In a general way, this report treats of the impact of technology on social organization, including family and farm organization. Surveys of many phases of technological change are included. The possibilities of each are appraised, somewhat, and there is much searching for what these may mean to our farm people. But beneath all the analysis does there not remain the fundamental question of

the relation of physical facts to social facts? In this connection, the reviewer calls attention to title of Part I, "Meanings." There is such a strong bias in our age in favor of reducing complex phenomena to simples and even social relationships to that which can be measured and counted, that the bold acceptance herein of "meaning" as a basic category deserves mention. How are physical things integrated into social relationships and social action? Not directly as things, but as uses, services, and values. This requirement makes meaning a fundamental ingredient of social facts whereas this is not true of brute physical fact. Yet it is difficult to see that there is any comprehensive social theory implicit in the report.

In so far as there is a unifying social theory it appears to be a form of the doctrine of equality. Technological progress is accepted as good; the problem is one of equitable distribution of benefits. "An underlying assumption of this report is that inventions and technological progress have been a major factor in raising the standard of living of all the people. . . . But it also has been recognized that these benefits have not always been distributed equally among all groups—that along with them have come certain maladjustments" (pp. 82–3). Comments on the problem of equality of opportunity are numerous.

Many suggestions are made for public action to deal with the problems which (presumably) are attributed to technological changes. These recommendations are developed under three general classifications: (1) programs designed for the security and welfare of the underprivileged or displaced rural people; (2) measures for the stabilization of commercial agriculture (mostly the present adjustment and price stabilization programs); and (3) measures designed to use the advantages of technology to enrich rural living.

To the uninitiated the list of recommendations seems to embrace most of the current program activities of the Department of Agriculture. Especially in connection with doing something for the displaced and underprivileged, a number of innovations are suggested: preferential credit treatment, the creation of a semi-public corporation to buy land from retirable farmers and sell it to young people without opportunities to begin farming; retirement homes for old farm people with small equities so that the land might be available to others; self-help cooperatives, the products of which

"would not be permitted to enter commercial channels" (p. 91); and others.

The whole report points in the direction of more social control. Somehow, we must direct technological changes toward goals of social improvement rather than disorganization but always the authors are confronted by situations of conflict. Technology increases the bargaining power of land owners; tenants may be squeezed down to casual laborers; the attempts to increase farm operators' income may increase the insecurity of tenants and laborers. One gets the impression that the authors are very puzzled by it but have not worked out a formulation of social theory that embraces this problem. But again this is one of the major problems of social theory. Must we not work out a general social theory for agriculture that does embrace both conflicts of interest and social control?

K. H. PARSONS

University of Wisconsin

Family Income and Expenditures, Monroe, Day, and Others, Bureau of Home Economics, United States Department of Agriculture: Plains and Mountain Region, Part 1, "Family Income," (Urban and Village Series), U. S. D. A. Misc. Pub. No. 345, 1939. Pp. 330, 30 cents; Pacific Region and Plains and Mountain Region, Part 1, "Family Income" (Farm Series), U. S. D. A. Misc. Pub. No. 356, 1939. Pp. 276, 30 cents; Five Regions, Part 2, "Family Expenditures" (Urban and Village Series), U. S. D. A. Misc. Pub. No. 396, 1940. Pp. 410, 40 cents.

These three publications are samplings from an important series of reports based upon the "Consumer Purchases Study." This study was begun in 1935 under the joint auspices of the Bureau of Home Economics and the Bureau of Labor Statistics, with the collaboration of the National Resources Committee, Central Statistical Board, and Works Progress Administration. The material is currently appearing in two groups of reports. The first group, Part 1, includes reports on *Family Income* (for each geographic region) for urban and village communities and for farm areas. The second group, Part 2, contains one report on *Family Expenditures* in urban and village communities, another on *Family Expenditures* in farm areas, and a series of reports on the detailed aspects of the major

categories of consumption such as housing, automotive transportation, food, medical care, and others. Many persons have become familiar with this entire project through the two publications of the National Resources Committee in which some of the results (along with other materials) were first presented, namely, *Consumer Incomes in the United States* (1938) and *Consumer Expenditures in the United States* (1939). The present series of publications covers intensively and with minute detail the field which was covered extensively in these well-known reports of the National Resources Committee.

The Consumer Purchases Study was undertaken "to provide data more comprehensive than any before available on the way American families earn and spend their incomes." To this end, the data obtained were designed to throw light upon the amount, origin and distribution of family incomes and upon the character of family expenditures.

The data obtained on incomes are such that it has been possible to classify families according to amount of income, sources of income, responsibility for family support, occupation, age, size or type of family, and home ownership. Moreover, it has been possible to cross-classify the data, for example, to study the relation between age and income, between amount of income and sources of income, between amount of income and number of earners in the family group, etc. The data on family expenditures, on the other hand, derived from complete annual budgets for the families covered by the study, constitute what is perhaps the most comprehensive material ever assembled for the study of the consumption patterns of different classes. With these data, expenditures have been studied not only in relation to incomes but also in relation to family type or size, occupation, type of community, race, and region.

Though the number of families studied was relatively small, intelligent and careful planning resulted in a sample which, when tested according to numerous criteria, proved to be reasonably representative of the country as a whole. The sample included complete or large random selections of families from 2 metropolises, 6 large cities, 14 middle-size cities, 29 small cities, 140 villages, and farms in 66 counties. Foreign-born, broken, and one-person families were excluded from the study, and Negro families were included only in the Southeast Region. However, in order to clarify the social and economic position of the group included in the study, and

to ascertain the degree to which the same was representative of the total population, a small number of schedules was obtained from ineligible families. Altogether, the success of the sampling technique is indicated by the fact that the data were useful in estimating incomes and expenditures for the entire population, as presented in the two reports of the National Resources Committee.

Overall, this investigation, a product of the combined efforts during a period of years of many skilled research workers and of several public agencies is a notable example of the several great contributions to the empirical knowledge of American society that have been produced within the past decade. This study describes, with a completeness and accuracy never before approached, the "getting and spending" of American families. The limitations of the study lie chiefly in the restrictions imposed by time and money, Its most obvious limitation is due to the relative smallness of the sample and the scatter of the areas from which data were obtained. so that it is not possible to compare geographic areas (except for the very large and somewhat meaningless regions that were employed).

HOWARD R. BOWEN

University of Iowa

The Plantation South, 1934–1937, William C. Holley, Ellen Winston and T. J. Woofter, Jr. Works Projects Admin., Div. of Research, Research Monograph XXII, 1940. Pp. xxii+124.

"The Plantation South 1934–1937" presents data and observations which may be of considerable value to unprejudiced students who have sufficient additional information, sufficient analytical ability, and sufficient interest in "The Nations Number One Economic Problem" to make a serious inquiry into an existing social and economic condition which lends itself to a vast and rapid improvement.

The gross income from cash receipts per plantations in 1937 was $13,679. If we divide the $13,679 gross cash income by the 16.2 families per plantation including the operator we have an average gross cash income per family of approximately $884. The net cash income per plantation in 1937 is given as $7,637 or approximately $471 per family including the operator. Since "costs chargeable to depreciation, improvements, and interests on long-term credit were not included" in determining the "plantation net cash income" we

may deduct five per cent interest on the $37,504 investment and four per cent depreciation on the $4,814 building inventory and 10 per cent depreciation on the $4,816 livestock and machinery inventory, and obtain a net cash income per plantation of $5,088. This will give an average per family net cash income of $315 if we assume a socialization of the plantation unit.

An interesting conclusion is drawn on page 28. "The high interest rates paid by tenants are a major factor in preventing their rise up the agricultural ladder. The interest rates increase indebtedness to such an extent that they automatically bar any accumulation of resources by a large proportion of all plantation families." The total dollars of interest paid per tenant family is not set forth, but by taking the "36 per cent weighted annual rate of interest" for the "3.4 months . . . duration of subsistence advances" on an average subsistence advance of $104 we arrive at an annual interest payment of $12.45 per family. Since the rates were "two or three times as high as those paid by operators" and if we assume a fair rate to be that rate paid by the operator, then it would seem that an overcharge of some $7.47 stand between the tenant and the happy ascension of the agricultural ladder. The rungs of this Jacob's ladder must indeed be close together.

Clever innuendo is carried out in the front cover etching and in the "Plantation Owner's Dwelling" and the "Sharecropper Home." With no small degree of humiliation we confess that the shabby housing conditions of tenants as portrayed are far too frequent in our area, but socialized agriculture is not the answer. The insinuation of great opulence among so called plantation owners may be corrected if we glance at the magnificent "Plantation Owner's Dwelling" and contrast it with the 4,118 dollar total investment in all plantation buildings including the "dwelling" 15 tenant houses, barns for 20 mules, implement sheds, cotton houses, and various and sundry outbuildings. Such thinly veiled propaganda smacks of the tragic era of carpet bag and reconstruction days.

But when and if the serious minded sociologic and economic analyst blows the luxurious foam of propaganda from the meager beer of information he might assimilate enough stimulus to hope for a vigorous and unbiased study of one of America's outstanding problems, namely, the low farm income of all tenure classes in the cotton belt.

J. N. LIPSCOMB

Mississippi State College

The History of Land Use in the Harvard Forest, Hugh M. Raup and Reynold E. Carlson. Harvard Forest Bulletin No. 20. 64 pages. Petersham, Massachusetts, 1941.

The authors distinguish between two methods of approach in silvicultural research: (1) the "analytical and experimental" method which treats trees as agricultural crops and aims at growing on a given tract of land those kinds of trees which will maximize economic returns under the prevailing physical conditions of soil, topography and climate; and (2) the "historical" method which aims at reestablishing the original timber composition "perhaps with judicious modification of stand composition here and there to ensure larger or quicker profits" (p. 5).

The present study adopts the second method. Hence, the first task is to trace back the history of land use of given timber tracts, to attempt to isolate the effect of the various practices and changes in land use upon the successive timber stands, and to reconstruct a fairly accurate picture of the original natural stand composition.

According to the authors, " . . . the central premise of the study is that present-day forest management cannot be carried on effectively without some knowledge of past land use. It follows in turn that land use cannot be understood without some knowledge of the farm economy in which forestry, farming, and local industry were interrelated activities. Moreover, these major activities were carried on largely by the same individuals, which suggests the economic problem of allocation of resources. How much of a family's labor and capital was to be applied to farming, and how much to local industry and lumbering? One of the interesting facts revealed by this study is that a certain mobility existed between the proportions to be applied in meeting these competing demands" (p. 8).

This statement of the problem, of course, catches the economist's fancy—but the further he reads the more he feels let down. For the authors proceed with a very cursory description of the history of property titles, population growth, agriculture and local industries in the town of Petersham, and then switch to a very detailed history of the various tracts in the Harvard Forest without attempting a systematic integration of these two frames of reference. The result is that this study, excellent as it may be from the specific viewpoint of a forester interested in the "History of Land Use in the Harvard Forest," has little to contribute beyond the scope of its title or to the general field of agricultural and forestry economics.

RAINER SCHICKELE

Iowa State College

Consumer Representation in the New Deal, Persia Campbell. New York, Columbia University Press, 1940. Pp. 298. $3.25.

This book traces the changes that have taken place in the organization, personnel and activities of consumer agencies in the New Deal. Included are those associated with the NRA, the National Bituminous Coal Act and the Agricultural Adjustment Program. Very little is said about County Consumers' Councils. The story unfolded shows clearly on the one hand the idealism and the broad social point of view of a few and on the other the insistence that producer interests alone be considered in framing regulations.

Price-fixing, control of production and distribution, quality labeling and consumer representation in the code authority were some important issues considered by the Consumer Advisory Board. The author summarizes policies developed on these and the major forces influencing them including the effect of facts presented and recommendations made. She concludes that "The policy articulated by all the consumer agencies was of a broad constructive nature" (p. 262). Yet she confesses that New Deal consumer agencies "had little influence on the course of events" (p. 262). In spite of this lack of influence she found, however, the C.A.B. was "sympathetic with the purposes of the National Industrial Recovery Act itself and approved the effort to effectuate those purposes through codes of fair competition" (p. 187), and that "the Board advised against the abandonment of the NRA experiment" (p. 188).

The final section of the book discusses the type of government agency needed to serve the consumer interest. Miss Campbell recognizes that the unorganized character of the consumer interest makes the establishment and functioning of a strong agency difficult. She sees in the growth of the consumer movement some hope for increased pressure that will serve to force policy makers, to a greater extent than in the past, to provide conditions contributing to the consumer interest. Although in her opinion the consumer New Deal agencies had little influence, she nevertheless considers that the experience of that period and the trend of events make clear the need for an agency to carry on research and to provide information bearing on the consumer interest. In addition such an agency would represent the consumer at hearings and on other appropriate occasions.

The subject matter of the book as a whole is well-organized and clearly presented. Many will find the historical details of very great

interest. The concluding ideas of the book would have been stronger had they shown a greater appreciation of the interplay of different groups in the economy. The future of consumer agencies is discussed largely in terms of their activities during the early years of the New Deal. In this period legislators and many others appeared to view the economy largely as a series of separate industries; thus the issues dealt with by consumer agencies had largely to do with intra-industry relationships. The effective functioning of the economy seems to depend as much if not more on inter-industry than on intra-industry relationships. It is thus important that consumer agencies recognize the scope of the issues to be taken into account and the far-reaching interplay of pressures affecting the achievement of maximum production.

MARGARET G. REID

Iowa State College

Die Binnen Kolonisation in Italien (Resettlement Policies in Italy), Friedrich Voechting, Kieler Vortraege, No. 64. Institut für Weltwirtschaft, University of Kiel. Gustav Fischer, Jena, 1941. Pp. 27.

The author, a professor at the University of Basle, Switzerland, and a competent student of Italian rural economy, sketches the central issues of resettlement and tenure reforms in present-day Italy in a masterly fashion. His explicit attitude toward the Fascist settlement policy is one of approbation; yet a good deal of judicious criticism is implied in his observations on the purposes and achievements of the settlement activities. The treatment of the problem is analytical rather than descriptive or eulogistic.

In Northern Italy, possibilities of new settlements are negligible as most of the land suited to agricultural use is already in intensive cultivation. Only one major irrigation project is in process of development in the Southern Po valley which will permit further intensification of farming and absorb some additional settlers.

In Central Italy the man-land ratio is fairly well balanced, and even the tenure structure relatively well adjusted. (I should like to add that the praise of the central-Italian share-cropping system and its secure, but poor, dependent and servile peasantry can only come from an oligarchic ruling class.)

The most important settlement and tenure problems are to be found in Southern Italy and Sicily. Absentee landlordism, instable

tenure conditions, poor land use patterns and exploitive practices create serious problems of tenure reforms, and considerable tracts of land are amenable to improvement through drainage, irrigation, clearing, terracing and fertilizer application.

Up to the Great Depression, the primary goal of settlement policies was to increase the national output of agriculture, and the settling of families on the land was rather incidental. Since the depression, however, emphasis has changed distinctly, as emigration no longer provided a safety-valve for population pressure, and the industrial centers discontinued to absorb farm people, and actually sent thousands of families back again into the countryside. Making room for people on the land became the primary goal of settlement activities. The absorptive capacity of Italian North-African Colonies for settlers proved to be very limited.

Fascist philosophy supports this goal of creating a large soil-bound and stable peasant class as a guaranty of social stability and racial health (let me mention that for Fascists these terms have meanings anti-thetical to those of Jeffersonian tradition). But in implementing this objective, Fascist policy faces a dilemma: to bind the farmer's soul to the earth, scattered farmstead settlement is the best device; but this type of settlement hampers the nursing of a collective Fascist spirit and fosters a socially dangerous attitude of independence and self-reliance. Ingenious compromises of farmstead and village-type settlements are being worked out, the general outlines of which are competently sketched by the author.

Most of the settlement activities are carried out by government sponsored and controlled semi-public corporations, the most important of which is the "National Veteran's Work" (Opera nazionale per i combattenti). The various reclamation and settlement projects are designed to become eventually self-supporting, with only few exceptions, as for instance the dramatic reclamation of L'agro pontino, of the Pontinian Swamps, which have been drained and are now, after 9 years, supporting 5 towns, 18 villages and 4,000 scattered farmsteads, inhabited by 60,000 people.

The most recent and far-reaching settlement work has been started in Sicily. Over one million acres of under-utilized and sparsely settled land in the island's interior is to be improved and opened for intensive cultivation and settlement. Twenty thousand farm families are expected to be settled in homesteads throughout this area. This land is held in large latifundia, entailed estates of a

landed aristocracy. The semipublic settlement corporation is granting loans for reclamation works to the land owners and supervises their performance. If the land owners fail to comply their land can be condemned and the work carried on directly by the corporation. Most of the land is expected to remain in the hands of the present owners and to be occupied by tenants under various share-cropper arrangements.

One gets the impression that interesting experimentation in settlement policies is in progress. Dr. Voechting successfully conveys to the reader the major issues involved in these policies.

RAINER SCHICKELE

Iowa State College

Studies in War Economics, International Labour Office, Studies and Reports, Series B (Economic Conditions), No. 33, Montreal, 1941. Pp. 199. $2.00.

In the growing literature on war economics, this symposium of six brief studies is one of the better contributions. The opening essay by E. F. Penrose, "Economic Organization for Total War, with Special Reference to the Workers," is a very clarifying discussion of the effects of a total war effort on the economic structure. One of the more important conclusions is that drastic curtailment of consumption goods during the early stage when full employment has not been approached may have damaging effects on morale and increase unemployment without bringing compensating advantages in the output of war materials. Even when full employment is reached and drastic reduction of consumption goods becomes necessary, such reduction should be discriminating rather than wholesale. Professor Penrose takes the position that "social justice should not be lost sight of even in war emergencies" (p. 40). He is strongly opposed to inflationary financial methods and believes that "the income tax should be the mainspring of war finance" (p. 32). His general disposition toward the Keynes plan is favorable.

The second article, by E. J. Riches, is devoted entirely to the Keynes plan and may be recommended to those who are interested in finding both a résumé and appraisal of the plan within a relatively brief compass. The essence of the Keynes plan is to prevent inflation by removing the discrepancy between increased money income and the reduced volume of consumption goods through the

establishment of a system of deferred wages, to be released with interest during the post-war reconstruction period when this impounded purchasing power is needed to combat the inevitable slump. An important aspect of the plan is its promise of a more equitable distribution of the war burden and of income in the reconstruction period. Mr. Riches appreciates the administrative difficulties involved, but apparently favors it as against inflation or a system of "wholesale rationing, price fixing, and wage control" (p. 70). In the reviewer's opinion, he is too strongly influenced by the possibilities of social equality which the scheme embraces.

The next study, also by Mr. Riches, deals with relative wages in wartime. Approval is given to wage increases due to greater hardship of occupation, increased living costs, and those which operate to distribute the labor force efficiently among the industries of a war economy. Mr. Riches is especially concerned with wage increases arising from increased demand for labor, but which cannot be justified by the three criteria mentioned. Here it is necessary to impose checks in the form of limitation of wage rates, prevention of competitive bidding by employers, and the limitation of strikes. The importance of voluntary negotation in imposing these checks is stressed.

In his essay on "Control of Food Prices," A. S. J. Baster starts from the assumption that the basic criteria in food price control are nutritional and military necessities. This is followed by a discussion of the problems and methods of price-fixing, control of profiteering and rationing. The conclusions are significant and well-stated. Baster holds that general price-freezing puts the economy in a strait-jacket, and that extensive rationing systems are extremely difficult to enforce, leaving room for extensive evasion with consequent injustice. He concludes further that "until means are discovered of reducing the purchasing power available for consumption to the minimum thought desirable by the Government in view of war needs, no system of food price control will work entirely satisfactorily" (p. 118). The implications of this conclusion for present price control policies in this country are obvious.

Carl Major Wright deals with "The Place of Housing Policy in War Economy." Special housing allowances and the adjustment of rents and leasing arrangements to needs are approved as emergency measures. General control of rents is held to contribute to a prevention of a general price rise, but the impediments which such con-

trol offers to proper allocation of existing housing facilities and to new construction are emphasized. Special stress is placed on the development of a low-cost housing program (including pre-fabricated houses) integrated with the general plan of wartime production. It is concluded "that in almost every country a comprehensive housing scheme will form an integral part of the social programme for the post-war years (p. 153). A considerable amount of material on the wartime housing policies of a number of countries and the problem of construction costs during wartime is included in the body of the article.

The scope of the final article by Edith Tilton Denhardt is indicated by its title, "The Effect of War on the Relative Importance of Producing Centres, with Special Reference to the Textile Industry." The impact, both of the last war and of the present war, on the textile industries of various countries is examined. The apparent aim of the article is to throw light on the general principles involved in the post-war readjustments of industries whose expansion has been stimulated by wartime dislocations of international trade. The discussion of these principles is not, in the opinion of the reviewer, very illuminating, as it does not get much beyond the truism that "if a new centre is to maintain itself, it must be able to produce at least as cheaply as the old centre when the temporary protection conferred by the war is withdrawn" (p. 157).

J. P. CAVIN

Washington, D. C.

Farm Ownership, Tenancy, and Land Use in a Nebraska Community. Robert Diller. University of Chicago Press, 1941. Pp. 192. $2.00

This is a study of the Diller community in southeastern Nebraska. The investigations cover the period since the land was held by the United States government.

An analysis is given of the role of speculators in the early distribution of the land. The economic history of the area since settlement is divided into two periods—the period prior to the close of the World War and the period afterwards. The first period was one of prosperity; the second, one of agricultural depression accompanied by drought. Comparisons of the two periods are made in regard to land values, mortgage load and foreclosures, duration of mortgages, and the ease of acquiring land. The author presents

evidence to show that, contrary to popular opinion, tenure of both owners and tenants has become more secure in this community. A comparison is made between tenants and the owner-operators in which it is shown that tenants are on a par with owner-operators in nearly all respects socially and economically.

The last chapter entitled "Roads, Farms, and Fields" is a criticism of the rectangular survey and would lead one to think that this has been the great cause of the deterioration of all land so laid out. While it undoubtedly has been a factor in unwise use of the land and the laying out of farmsteads and roads, it is hardly so important as presented.

A complete appendix occupies approximately one-half the book.

In this short space it is impossible to discuss all the points on which there might be a divergence of opinion. The main criticism of the reviewer is that too wide an implication is given to the conclusions of the study. The only references to the people of the community are in a footnote and in the appendix. These indicate that it is largely a German and Bohemian settlement. While the nationality of the people has no bearing in itself, there are cultural groups that live in more or less socially isolated communities where the land is held largely within the group through succeeding generations. These so-called "social islands" ordinarily do not have such acute problems of land ownership and tenancy as are found at large in the Middle West.

The increase in rented land is cited as an indication of increasing stability. It is pointed out that while the proportion of the area under lease has increased from a low of 35 per cent in 1910 to 77 per cent at present, it is a normal development and is the result of economic maturing of the community. This has resulted from a loss of popular interest in ownership of land. The retiring generation, rather than selling the land, is either retaining ownership or turning a large proportion over to the heirs. If this is the normal rate of development, it raises the question as to how much higher it will go, for it is doubtful if economic maturity has been reached this early in the history of the community.

The loss of 60 to 70 per cent of the value of land from the close of the World War is described as merely an emotional loss. To those who have sustained this loss, such a statement must sound ironical, for to them it certainly has veen very real.

Comparison is made between the respective farming ability of

tenants and owner-operators. The comparison is between farming in the community today with its high proportion of tenancy, and farming as it was formerly. The possibility of improving the present standard of farming in the community is also discussed. It seems that a more meaningful comparison would be between the job done by tenants and that of owner-operators at the present or at some other given time.

Much of the discussion is wordy and contains unnecessary criticisms. The reviewer is of the opinion that the data, while at times confusing and difficult to interpret, are useful and informative in their application to this community, but should not be taken as typical of the Middle West.

JOHN H. MCCOY

Kansas State College

NEWS ITEMS

The Committee in charge of the I. G. Davis Memorial Fund has turned over to the Trustees of the University of Connecticut 420 books and slightly over $1,100.00 in cash for the support of the I. G. Davis Memorial Library. This library which specializes in the fields of land utilization and cooperation has been established as a part of the library of the University of Connecticut in memory of Professor I. G. Davis who at the time of his death in 1939 was President of the Farm Economic Association.

Byford Bain and Don Smith, previously Assistants in Agricultural Economics at the University of Illinois but more recently employed in the Milk Market Administration in St. Louis and the Equitable Life Insurance Company, respectively, have accepted positions in the Commodity Credit Corporation in Washington, D. C.

F. D. Barlow, Jr., instructor in the Department of Agricultural Economics, Louisiana State University, for the Summer Session 1941, will resume his graduate study at the University of Chicago in an extension of a General Education Board grant for 1941–42.

George T. Blanch will return to the Utah State Agricultural College on July 1, after having spent a year at Cornell University in completing his graduate work.

Dewey O. Boster, formerly assistant agricultural statistician in the Orlando, Fla., office of the Agricultural Statistics Division, Agricultural Marketing Service, has been placed in charge of the Trenton, N. J., office. He succeeds the late George L. Morgan.

Mr. Boster joined the U. S. Department of Agriculture in February 1934 and was assigned to the Louisville, Ky., office of the Agricultural Statistics Division, as junior crop and livestock estimator. In September that year he was transferred to Montgomery, Ala., where he remained until his assignment to Orlando, Fla.

H. C. Bradshaw, Economist in Farm Taxation, Division of Farm and Ranch Economics of the Texas Agricultural Experiment Station, has been awarded a General Education Board fellowship to do a year's work toward the Ph.D. degree at the Graduate School of Public Administration of Harvard University.

Raymond G. Bressler, Jr., Assistant Professor of the Department of Agricultural Economics and Farm Management, has been granted a three months leave' of absence from the University of Connecticut for a special assignment. Mr. Bressler will work for three months with the Bureau of Agricultural Economics on a survey of agricultural marketing facilities in connection with a one and one-half million acre tract being opened for agricultural production through irrigation from the Grand Coulee Dam. His headquarters will be at Spokane, Washington.

Charles M. Brewer has been appointed senior bacteriologist of the Insecticide Division of the Agricultural Marketing Service to fill the vacancy resulting from the recent death of G. L. A. Ruehle.

Oswald Brownlee has been awarded a Farm Foundation fellowship for

1941–42 to pursue advanced studies at the University of Chicago. Mr. Brownlee has been granted a year's leave of absence from his post at Iowa State College.

Robert Buck, Extension Associate in Agricultural Economics, Iowa State College, has recently accepted a position with the Farm Security Administration, Washington, D. C.

Appointment of John L. Buntin of Orlando, Fla., as transportation specialist in the Agricultural Marketing Service, was announced on June 4.

Mr. Buntin, who joined the U. S. Department of Agriculture after 18 years of service with railroads serving important agricultural areas, will have immediate supervision of transportation matters. These activities include the direction of all reporting programs in connection with shipments, movements, and unloads of farm products as reported by public carriers. He assumes the duties of the late James G. Cross, who until his death on November 22, 1940, was identified for 22 years in the Department with the collection of transportation statistics.

R. T. Burdick, Associate Economist at Colorado State College, has been awarded a fellowship by the University of Chicago in cooperation with the Farm Foundation and has been granted a leave of absence, beginning in September 1941, for graduate study. He will give special attention to an analysis of the labor and material requirements of crops and livestock.

J. R. Campbell, instructor in Farm Management at Louisiana State University has been granted a general Education Board Fellowship to attend Cornell University for next year.

Walter P. Cotton came to South Dakota State College from the University of Minnesota, on April 1, as Assistant Professor in Agricultural Economics. He replaces Max Brown, now a Second Lieutenant in the U. S. Army. Mr. Cotton has spent the last two years doing graduate work at Minnesota. His work at South Dakota State College will be in the field of Agricultural Marketing.

Oscar Day, formerly with the Farm Mortgage Department of the Equitable Life Assurance Society and with the Farm Credit Administration, has accepted a position with the Economic Research Department of Wilson and Company in Chicago.

John Davis, formerly at the University of Minnesota, has been appointed Associate Agricultural Economist on the staff of the Cooperative Research and Service Division of the Farm Credit Administration.

J. Norman Efferson, Assistant Professor in Department of Agricultural Economics at L. S. U. will serve as visiting Professor at Cornell University for the 1941–42 session. He is exchanging assignments with Professor Williamson of the Cornell faculty.

Leonard K. Elmhirst of Dartington, England, president of the International Conference of Agricultural Economists, recently visited the campus of the North Dakota Agricultural College.

A. W. Epp of St. Paul, Minnesota, has been appointed as Assistant in Economics to succeed Mr. Ramey C. Whitney who resigned his position with the Department of Economics, Sociology and History, Colorado State College in March in order to accept an appointment with the Bureau

of Agricultural Economics, U. S. Department of Agriculture, at Lincoln, Nebraska.

George V. Gaines and John P. Dempsey, College of Agriculture, University of Georgia, are assisting in the Department of Agricultural Economics and Rural Sociology, University of Georgia.

R. L. Gastineau has been named secretary of the Crop Reporting Board to replace Mr. Wiland. Mr. Gastineau has served as a member of the Division since January 1935. He gained valuable experience during his service at Denver, Colo., until November 1939, at which time he was transferred to the Washington office.

Melvin P. Gehlbach, for several years a full-time Assistant in Agricultural Economics, University of Illinois, has accepted a position as fieldman in the Farm Bureau Farm Management Service at Ottawa, Illinois.

Reid M. Grigsby, research assistant in Marketing at Louisiana State University has been selected as a student at the summer Spanish and Portuguese Institute for extensive study during the summer on the University of Wyoming Campus.

Harold G. Halcrow, Instructor in Agricultural Economics, Montana State College, has been awarded a Farm Foundation Fellowship to continue his graduate studies in Economics at the University of Chicago.

D. O. Hammerberg, Head of the Department of Agricultural Economics and Farm Management, University of Connecticut, has been appointed Milk Administrator for the State of Connecticut. He will resign from the University on June 30, 1941 and assume his new duties on July 1, 1941.

Glenn W. Hedlund has been appointed Head of the Department of Agricultural Economics of The Pennsylvania State College, effective September 1, 1941. A graduate of the University of Nebraska, he received his Ph.D. degree from Cornell University in 1936. Doctor Hedlund leaves a position as Extension Associate Professor of Argicultural Economics at Cornell University. He was appointed to the Extension staff at Cornell University in 1933. For one year, 1936–37, he was engaged in teaching and research at the University of Nanking, Nanking, China; and in the Summer of 1939 was a member of a committee of three engaged in a study of the agriculture of Bermuda, at the request of the Bermuda legislative body. Doctor Hedlund succeeds F. F. Lininger, who will devote his full time to the position of Vice Dean of the School of Agriculture and Vice Director of the Agricultural Experiment Station.

Paul G. Homeyer, instructor in prices and statistics at Louisiana State University will be on leave for 1941–42 to continue his graduate study at Iowa State College.

Sidney Hoos has resigned from the University of California to accept a position as Economist with the Commodity Credit Corporation, Division of Economics, United States Department of Agriculture, Washington, D. C.

Leo Hoover, Iowa State College, has accepted a position with the Farm Security Administration.

Alexander Joss, Instructor in Agricultural Economics at Rhode Island

State College, resigned June 30. He has accepted a position with the Department of Agricultural Economics of the University of California.

Sherman O. Kessler resumed his position as Extension Economist in Farm Management at Purdue University, July 1, after having completed nine months' study under a Farm Foundation fellowship at the University of Chicago.

Frank P. King, Associate Professor of Agricultural Economics, University of Georgia, attended the 1941 Summer School at Cornell University for the purpose of studying farm management and farm prices.

Loring K. Macy, Extension Assistant, Agricultural Economics, Iowa State College, has accepted a position with the Farm Security Administration.

Carl Malone, fieldman, Central Iowa Farm Business Association, has been appointed Extension Assistant, Iowa State College.

Louis D. Malotky, Assistant in Agricultural Economics, University of Illinois, has recently accepted a position with the Farm Security Administration at Washington, D. C.

W. K. McPherson, formerly of Iowa State College, has accepted a position as Associate Agricultural Economist with the Alabama Agricultural Experiment Station.

R. G. Milk, Junior Agricultural Economist, University of Tennessee, has tendered his resignation effective July 1. He has been engaged in land-use planning research in cooperation with the BAE.

Harvey W. Miller of the University of Wisconsin and Mr. Alvin R. Hall of North Dakota State College, have been awarded fellowships to do graduate work in Agricultural Economics at Montana State College for 1941–42.

Cap E. Miller and C. F. Bortfeld appeared on the program of the thirty-third annual meeting of the North Dakota Academy of Science.

The Social Science Research Council has awarded William H. Nicholls, Assistant Professor in Agricultural Economics at Iowa State College, a post-doctoral fellowship for 1941–42. Dr. Nicholls will pursue advanced studies in research at the University of Chicago.

B. D. Raskopf, Assistant Agricultural Economist, University of Tennessee, has taken leave of absence to serve as a reserve officer in the Army. Mr. Raskopf has been engaged in studies of cotton marketing in cooperation with the Federal Agricultural Marketing Service.

Edward Rutledge, who served the Department of Economics, Sociology and History at Colorado State College for a temporary period of four months, has received an appointment with the Farm Security Administration, Indianapolis, Indiana.

James Vermeer, Extension Associate in Agricultural Economics at Iowa State College, has resigned to accept a position as Agricultural Economist with the Rural Rehabilitation Division of Farm Security Administration.

L. H. Wiland, who has been secretary of the Crop Reporting Board of the Agricultural Marketing Service since October 1937, has been placed in charge of the Richmond, Va., office of the Agricultural Statistics Division

of that Service. He succeeds Henry M. Taylor, now a captain with the 132nd Service Unit at Fort George G. Meade, Md.

Walter W. Wilcox is on leave from the Department of Agricultural Economics, Iowa State College to assist at the University of Tennessee and T.V.A.

W. D. Woodin who plans to complete his work for the Ph.D. at Cornell University in June will join the staff of the Department of Agricultural Economics, Louisiana State University, July 1, 1941.

The new officers of the Western Farm Economics Association as elected by the group at its annual meeting held in Salt Lake City on June 25, 26, and 27 are as follows: President—R. R. Renne, Montana State College, Vice President—Rex E. Willard, Bureau of Agricultural Economics, Berkeley, Secretary-Treasurer—Harold F. Hollands, Montana State College.

A conference of Agricultural Economists and Rural Sociologists was held June 23–27, 1941 at North Carolina State College. The theme was Analysis and Interpretation of Social and Economic Data. The objectives of this conference were: 1. To give research workers in agricultural economics and rural sociology an opportunity to consult with competent mathematical and theoretical statisticians on the statistical aspects of their research work. 2. To provide a forum for the exchange of ideas and methods of statistical analysis being used on research projects now under way.

Government Seeks Mineral Economists

Mineral resources are of the utmost importance to National Defense. In this connection the Government is looking for persons especially qualified in the economic aspects of the mineral industries to do professional research in the fields of minerals, coal, and petroleum. Civil-service examinations for these positions are now open. The salaries range from $2,600 to $5,600 a year. Applications will be rated as received at the Commission's Washington Office but interested persons are urged to file their applications at once. Further information, including the exact education, experience, and substitution provisions, is contained in the formal announcement. Announcements and application forms may be obtained from any first- or second-class post office or from the Civil Service Commission, Washington, D. C.

WILLIAM ALLEN

1892—1941

Included in a list of persons reported "missing, believed lost," which the Canadian Government announced on May 6, was the name of William Allen, Agricultural Commissioner for the Canadian Department of Agriculture in the United Kingdom. Dr. Allen, who had many friends on this continent and in Europe, was returning to his post in England following a visit of some months in Canada. Also among those lost were a considerable number of Canadian army, air force and navy men, eleven United States air pilots en route to England for transport service, and a small group of civilians.

Dr. Allen was born in England and while quite a young man came to settle on a homestead in Saskatchewan. With the outbreak of war in 1914 he enlisted with the Canadian forces, went overseas, was severely wounded and finally invalided back to Canada. He then entered the University of Saskatchewan and graduated with a B.S.A. degree and a scholarship covering two years of graduate training in the United States. He spent these years at Cornell and Harvard, returning to Cornell on an instructorship to finish his doctoral work.

In 1925, Dr. Allen organized the Department of Farm Management at the University of Saskatchewan and he remained as its head until 1938. During this time he engaged in extensive research and published a series of reports based upon economic surveys. In recognition of his ability he was appointed to the Saskatchewan Milk Control Board, the Land Utilization Board, and the Agricultural Advisory Committee. Other honors included the presidency of the Canadian Agricultural Economics Society and membership on the Council of the International Conference of Agricultural Economists.

In 1938 he was appointed to the position of Agricultural Commissioner in London. The announcement was received with approval throughout Canada. He remained in England during the first year of the war and returned to Canada last summer to discuss marketing conditions. In the fall he again went to England with the Canadian Minister of Agriculture and a party of officials to consider the marketing situation. On his return to Canada during

the early winter he addressed a series of meetings across the Dominion.

Modest and retiring, a loyal friend and highly esteemed fellow worker, his loss will be keenly felt by all who knew him on both sides of the Atlantic, and in particular by the Agricultural Economists of Canada with whom he had been intimately associated for the past fifteen years.

In 1926 Dr. Allen married Gwendolyn M. Woodward. Mrs. Allen now resides in Toronto. He is also survived by two brothers and two sisters resident in Canada and by a third brother living in England.

J. F. B.

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Among the articles appearing in the August, 1941, or immediately succeeding issues are:

Subsurface Resources and Surface Land Economics ..... James Salisbury, Jr., and Leonard A. Salter, Jr.

Grazing Development in Western Oregon: An Experiment in Cooperative Land Development and Control ..... M. L. Upchurch

Industrial Location and Reconstruction in Great Britain ..... Lee S. Greene

Police Power for Counties ..... Herman Walker, Jr.

Changes in Farms and Farm Tenure, 1935-1940 ..... George S. Wehrwein

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